

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

1886.—Vol. XLIII.

LONDON, SATURDAY, SEPTEMBER 13, 1873.

{ PRICE.....FIVEPENCE.
{ PER ANNUM, BY POST, £1 4s.

Original Correspondence.

FOREIGN MINING AND METALLURGY.

The exception of the manufacture of some rather important articles, and some orders in course of execution for special iron, the ironworks present generally only little activity. The English pig, which is partly attributed to a new German process, is in demand for the Belgian iron trade. It is looked for in the demand for merchants' iron on German soil. Iron is purchased nominally at 10*l*. 8*s*. to 10*l*. 16*s*. per ton. The pig is quoted at 5*l*. 2*s*. 6*d*., and casting pig at 6*l*. 8*s*. per ton. It is a favourable one for proprietors of works who are desirous to enlarge or improve their buildings and appliances, as it is quiet periods that firms and companies can proceed economically with operations of this kind. After inaction there is a reaction. There is little or no diminution of activity in the working of minerals, and the production of the Grand Duchy of Luxembourg. The Council of State, in a decree of Aug. 27, has required a second vote in connection with the grant to Luxembourg forgers, a recent vote of the Chamber of Deputies not having collected an absolute majority. The Providence Forges Company will pay Oct. 31 a dividend for 1872-3 at the rate of 6*l*. per share.

The French iron trade does not improve; indeed, a slight revival is reported recently can scarcely be said to have been maintained. On various sides a rather serious want of orders is noticed, and the future is surrounded with painful anxieties. Both commercial and political preoccupations appear to exert some influence upon the condition of metallurgy in France, and tend to restrict the current of affairs. Nevertheless, prices maintain themselves well. Thus, coke-made is quoted at St. Dizier at 10*l*. 16*s*. for charcoal-made pig for refining, at 6*l*. 12*s*. to 6*l*. 16*s*. per ton; coke-made pig, 4*l*. 16*s*. to 4*l*. 17*s*. 6*d*. per ton. In the Nord iron 10*l*. 16*s*. to 11*l*. per ton. At Paris coke-made iron is dealt at 12*l*. 8*s*. per ton. Notwithstanding the relatively quiet state of the French iron trade, some establishments and companies appear to regard the future with confidence. Thus, the Turcoigne, and Bességes Forges Company has decided to contract for 120,000*l*. by means of 6000 obligations, to be issued at 18*l*. 10*s*. each, in 24 years. The formation is also announced at Paris of a company, with a capital of 80,000*l*., for the manufacture of commercial steel by the Gallet process. A striking circumstance has occurred this week in France to the detriment of the coal market. English arrivals are acquiring importance every day, and a coal syndicate formed at Lille is about to give out very large orders in England, the English coal which have been tried having given satisfaction to most French industrialists. The arrivals of coal which have been by railway have been considerable of late, but the regular boats have been rather small. Notwithstanding that an attempt has been made in the coal of the Ruhr basin, whole trains of coal are reaching Paris; it is intended for the Parisian Gas Company, which appears to have concluded considerable contracts. Circumstances serve to explain the concessions which some of the basins of the Nord and Belgium are beginning to make. Prices are, for the rest, extremely variable on the Paris market, and it may be said, upon the whole, that the state of affairs is not as it was a week since. The Loire Mines Company has declared an interim dividend for 1873 at the rate of 6*s*. 6*d*. per share.

The next great sale of tin in Holland will take place on Sept. 25, at Amsterdam. The sale will comprise 30,000 blocks. The visible stock of Banca tin in Holland at the close of August was 185,333 blocks, as compared with 121,278 ingots at the close of August, 1872. The supply of Billiton tin in Holland at the close of August was 109 ingots, as compared with 25,200 ingots at the close of August, 1872. The Dutch tin market has been quiet; Banca has risen 7*l*. to 78*l*. 5*s*., without any very extensive transactions taken place; the latest advices speak, however, of a stronger demand, and some parcels to be delivered at the approaching sale. Some parcels of Billiton under sale at 76*l*.; the demand has been rather animated, and it is not expected to have any stocks of importance. As regards copper, it may be noted that Chilean bars, delivered at Havre, brought 87*l*. per ton; ditto in bars at Paris, 87*l*.; ditto in bars at London, 87*l*.; English tough cake, 91*l*.; and Corocoro minerals, standard, 91*l*. per ton. At Marseilles, Spanish in plates for export has been quoted at 82*l*. per ton. Lead has been firmly held, but has not given rise to many transactions. French delivered at Paris has brought 22*l*. 16*s*. per ton in that capital; ditto, delivered at Havre, 22*l*. 16*s*. per ton; English ditto, delivered at Havre, has realised 22*l*. 16*s*. per ton; and Belgian ditto, delivered at Paris, 23*l*. per ton. At Rotterdam, Stobal has realised 14*l*. 5*s*.; Spanish, 13*l*. 5*s*.; and German of various sorts, 13*l*. 5*s*. The German zinc markets have exhibited very little activity. At Paris, Silesian zinc, delivered at Havre, has realised 13*l*. 5*s*. per ton; ditto other good marks, delivered at Havre, 13*l*. 5*s*. per ton.

An industrial undertaking has been founded in Belgium, under the name of the Arsimont Colliery Company. The founders of this company are MM. Bouquerot, Georges de Soubeyran, M. Schnapper, de Haber, Fernand Foy, Olivier Keneufve, Charles de Thévenin, and G. E. Bouquerot, of Châtelet, near Charleroi. According to the statutes which have been prepared, the capital of the company has been fixed at 100,000*l*., divided into 8333 shares of 12*l*. each, paid-up to the extent of 10*l*. 8*s*. each; the remaining 2000*l*. is to be called up at the discretion of the council of administration. The office of the company is to be at Avelais. The coal has been maintained in the Liège basin, a circumstance which has not surprised any one. A fall which has taken place in the Liège district has, however, been a good deal remarked upon as a serious indication of declining activity. In the remainder of the district prices have also been well maintained. In this quarter of the district the coal has been less considerable than in other districts. It has been declining, because the condition of metallurgical industry is extremely precarious. Foreign coal continues to flow into Belgium, and workpeople are returning from the fields to the mines, and in

habitual clients, rendered prudent by the recent transport crisis, are largely supplied in advance. Such are the conditions under which the autumn season opens. There will clearly be no want of coal this winter in Belgium.

DEPOSITS OF MAGNETIC IRON ORE IN BRAZIL.

SIR,—Enclosed we have much pleasure in handing you an interesting report on mines in the province of São Paulo, which we have received from our correspondent in Brazil. In case you should consider the same of sufficient importance, we shall feel obliged by your bringing it under the notice of your readers.

Line-street, Sept. 5. G. A. WITT AND CO.
Report on the Mines of Jacupiranguinha and Turco, confluent of the Ribeira (river) of Iguaçu, in the Province of St. Paul, Empire of Brazil.

The magnetic iron ore is met with in large masses and blocks, heaped up on the surface of the ground, and occupying an area of 3,171,000 square metres, to a depth calculated to be over 2 metres. No digging to any extent will, therefore, be necessary for the next 100 years, all the work being under sky. The samples of hydrated iron ore from the mines on the banks of the Ribeira (small river) of Goethio, and extend to the confluence of this river with the River Turco, the northern limit of the concession.

A decree granting these mines to Don Joaquim Ignácio Silveira da Motta allows the concessionary to found a colony of immigrants, Government granting the necessary lands at the price of half a real for 4*m*. 25*l*., the lowest price stipulated in the law.

These mines are situated between the first range of mountains which run along the Ribeira of Iguaçu and its tributary rivers, and the great chain called the Serra de Mar, or Sea Mountains. There is free navigation for canoes carrying 3500 kilos. up to the port of Jono Pereira, in the Jacupiranguinha, a distance of 2200 metres. If the road by land be continued to the junction of the River Jacupiranguinha with the River Quarahir, thereby forming the River Jacupiranga, the distance will be increased 8250 metres, and at that point flat-bottomed steamers can approach to load the iron. From this point to the confluence of the Ribeira of Iguaçu the distance is 39,600 metres, and thence to the port of Iguaçu, in the Marquês (little sea) it is 37,950 metres.

The transport of the iron may also be effected to the port of Cananea, distant 33,500 metres of level ground. Also, by way of Hírcia, along the River Turco, a distance of 19,800 metres, steam communication being already established between that port and Iguaçu.

All the land on which the mines are situated, from the Jacupiranguinha to the Turco, is covered with thick virgin woods. Fuel is, therefore, abundant, besides which there are indications which lead to the belief in the existence of coal, for bituminous limestone is met with.

As to the quality of the ore and the excellent condition of the mines, it is merely necessary to transcribe the experiments of the eminent engineer, Silva Continho, mentioned in the following extract of his report on the west part of the Province of St. Paul, presented to the Imperial Government, and published in the *República*, No. 498, of Oct. 19, 1872:—

"The hydroxide and oxides of iron constitute the greater part of the samples which I have examined, and are the richest ores of the kind. The first contains 88.59 per cent. of iron, the second 86.90 per cent., and sometimes more. The deposit of Jacupiranguinha is, therefore, as important as that of St. John of Ipanema as to the quality of the ore, and certainly far superior when the facilities of transport and abundance of fuel are considered. The extreme limit of the mines is 14 leagues distant from the port of Iguaçu, and for nearly all that distance the Jacupiranga is navigable, a road being necessary for only 2 or 3 leagues. The freight of an arroba (32 lbs.) thence to Iguaçu can never exceed 80 reis."

MINING IN NEW SOUTH WALES.

SIR,—I see by the daily telegrams from London that our mines are attracting some little attention, and, with your permission, I will briefly point out the preliminary cost of securing mineral grants, or leases, with the conditions attached, so that anyone inclined to invest may know beforehand what absolute cash out of pocket is required. Mineral leases, which give a right for all kinds of mining (except gold), cannot be taken up in less-sized areas than 20 nor more than 80 acres; but any one individual may take as many separate blocks as he likes to pay for. The cost is 5*s*. per acre per annum for three years, at the expiration of which, if the improvements amount to 2*l*. per acre, a title at once issues; but this outlay need not be incurred until even the last month of the three years, provided it be within that period; or, the land can be conditionally purchased by paying down 10*s*. per acre, and another 30*s*. at the end of the third year. The word "improvement" is very loosely construed, and it is very seldom that any title is refused so long as the cash payments for rent or purchase are made—whether 1*l*. or 1*s*. per acre has been spent in mining. To the speculator or discoverer one great advantage of this system is that, supposing his means be limited, and he hears of good mineral country, he can secure the right to it at once for a comparatively small sum, and have three years to induce capitalists to develop it, or save some means of his own to do so with. His lease also gives him right to use all timber and water privileges, free of extra cost, and also all grazing rights. The principal leases taken up lately have been for coal, copper, tin, and diamonds (!); silver only two applications, although the lode is good and plentiful, but, curiously enough, no one here knows how it ought to be worked, or can be treated, and the best known mine, with samples giving about 11 per cent. of lead and from 12 to 70 ozs. of silver, lies idle!

Tin has taken most attention lately, and though several reefs and lodes are known to exist, we are only working the stream tin, and do not attempt to wash when it gives less than 1 oz. per dish—very many claims giving even as high as 6 lbs. or 8 lbs. per dish. The total outlay to start a mine of this kind is about 500*l*. for tools, water-races, boxes for sluicing, clearing, &c.—but, owing to unskilled miners and worse managers, not more than one-tenth of our mines are paying more than wages, though I am told by Cornish miners, accustomed to tin working in England, that such properties would yield great returns if worked by English system and skilled labour.

Diamonds are only just beginning to be washed for, and as yet pay well, but as none of the men employed ever saw them worked for previously, it is all guess work as to the best way.

Copper is attracting great attention with us, as since the falling off in South Australian mines (as compared to the labour employed), we have had an influx of good miners, who are beginning to show us the way; and, as nearly all our copper ores contain a large percentage of gold (notably the "Goodrich" and the "Somers"), they will no doubt pay well eventually.

As to gold leases, the regulations are different. No one quartz lease can exceed 25 acres, each acre representing 72 feet along the line of reef, with a width of 300 feet on each side; the rent is 1*l*. per acre per annum, and the leases cannot be made into freeholds, like all other minerals may be. As soon as the lease is issued one

* Goodrich ore from 7 to 30 per cent. copper; gold 2 ozs. to 11 ozs. per ton. Somers ore from 11 to 40 per cent. copper; gold 6 dwts. to 4 ozs. per ton. The last 12 months export of tin was 5936 tons.

man per acre must be employed, and when payable gold is struck the work must be continuous. The regulations specify two men per acre, but, as a matter of fact, the law is leniently construed, and on good reason shown labour may either be reduced or be suspended for three months at a time (now and again), or two men even allowed to hold a 5 or 10 acre block, if only some sort of work progresses. In lieu of men, machinery or horses count in the ratio of 1-horse power as equal to two men, by which means a small crushing plant and eight or ten men fully protect a 20-acre lease. The usual course of working is to follow the reef itself down for 50 or 100 feet to prove it, and see which way it underlies, or slopes downwards, and then to sink a perpendicular shaft to intersect it at 150 or 200 feet, by which means the reef is then worked or stopped overhead, and falls down to bottom of drive or shaft, and is then hoisted straight up; the average cost of sinking and timbering a shaft is about 2*l*. 10*s*. per foot, but in very hard country it doubles or even trebles that.

A reef of 9 inches wide, giving 1 oz. per ton, will pay very well; but the most permanent kind are the large poor reefs, or rather deposits of about 7 to 10 dwts. per ton, where the easiness of getting out and the great size enable a larger quantity at less cost to be raised and crushed. A deposit, or "blow," of this kind has just been bought by myself, ranging in width from 24 to 70 feet, and proved down to 26 feet, trial crushings from which gave 8 to 10 dwts.; and as there is water-power to crush by, and the total cost of the plant will not exceed 3000*l*., and will treat 200 tons per week at a total cost of 4*s*. 6*d*. per ton, the profits are likely to eclipse the more showy reefs of 3 to 4 ozs., but only 6 or 8 inches wide. We are rather new as yet in treating these poor reefs to what our Victorian neighbours are; and the real value of this ore was only found out by one of my managers (from Ballarat), who had Victorian experience. There is really a fine field out here for any number of companies, provided they send out a reliable inspector; and for three mines out of four a total of 4000*l*. is all that would probably be required, and in very many cases even as many hundreds would do. Most of the bubble companies here have burst; folly and fraud have had their day, and mining is slowly but surely becoming one of our recognised industries in New South Wales, and with proper honest and capable management offers far greater inducements to the capitalist or investor than in any other colony in these seas. I shall be very willing to give you, or any of your readers, whatever information (special or general) that lies in my power—free of cost. Sydney, July 11. ROBERT ADAMS.

GAULEY-KANAWHA COAL COMPANY.

SIR,—In the discussion on this company no mention has been made of one very important point—the strata in which the seams of coal are found. I have always understood from works on geology (Lyell and Ansted, I believe) that the coal beds of Virginia are not in the true coal measures, but in the oolitic series, like those of Southern Brazil. It is well known that coal in the oolite is always of inferior quality to that found in the true coal measures.

CAUTION.

AMERICAN MINING.

SIR,—That a reaction would take place in respect of mining enterprise in the Western States of America is what might have been safely predicted, even from its darkest and most depressing times. But it is to be hoped that the lessons of the recent past will not soon be forgotten. It ought not to be considered presumptuous in me to animadvert on the heedless course which was pursued by many individuals in respect of those enterprises. If I were one of those who affect wisdom after the transpiring of events, my present action would be far from commendable; but you, Sir, as well as many others, may remember that I very frequently warned, through the *Mining Journal*, against the consequences of such a rash course of speculation, which, under the name of "investment," was then being pursued. I wrote from a personal knowledge of the capacities and peculiarities of many of the districts of Western America, and my writing was dictated by a desire to promote legitimate mining. I attributed no fault to the mines—if undeveloped properties may be dignified by such a term—if only proper selections were made, but of the manner in which they were generally regarded and operated I again and again took exceptions. It may be strong language, but I unhesitatingly affirm, and on the basis of statistical facts which have been handed down to the present time from the best authorities—that no mines were ever discovered that could creditably survive such abuses. Thoughtful English miners, who were in the Western States of America at the time, saw and felt that the representatives of English capital had, if I may be allowed the expression, un-Englished themselves, and they turned blushing away from the scene, less proud of their country, from intelligible causes, than they had formerly been. There is not the least doubt, so far as my own convictions are concerned, that the majority of those sent to negotiate, or to examine for the purpose of negotiating or otherwise for the purchase of mines, allowed themselves to be led away by the novelty of the circumstances, whatever these may have been, by which they were surrounded, and became affected by the whirl of excitement which prevailed, adventurously or otherwise, in the districts to which they had been sent. The proverbial caution of the English seems to have been as evanescent as a summer morning cloud, and no personal or national pride is now involved in the reflection that we are generally spoken of in America as the "credulous," instead of as formerly the "judiciously cautious English people."

I flattered myself when I first saw that the attention of English capitalists had been directed towards the Western States of America that our long and varied experience in mining in various parts of the civilised world would have been proof against the sophistries and artificialities of American cunning and boldness, and so I boasted, but before I left Nevada I was compelled to admit that I had sedulously fostered a delusion. The *Journal* can testify that I repeatedly advised all English mine captains and engineers to most rigidly adhere to fundamental principles, consonant with their past experience, as I well knew, from what I had been subjected to myself on my first visit to certain mines of Nevada, in the interest of a New York company, what kind of tactics would be practised upon them. To confuse by subtle theories, which purported to show that all analogies failed in judging of American mines by the European standard, was an invariable practice, and hence the current presump-

tion, which was largely accepted as true, that the laws prevailing in the mineral kingdom in the Western States of America and those prevailing in Europe were altogether different from each other; and I have again and again been told, with evident sincerity, that I must not judge of American mines by the European standard. But I found that I was generally successful in disposing of that fallacy by the following interrogative reply—"What do you know of the mines of Europe? Have you ever seen them?" A composite question, which was invariably met, if it were met at all, by a negative answer.

I have endeavoured to show from time to time that the results of mining enterprise were as much affected by the terms of purchase as they were by the manner of their working; and also that mines generally could be purchased in Nevada, and I presume in the other Western States of America, direct from the owners for one-tenth of what they were sold for in London. I went further, and stated that a great many of the mines being comparatively undeveloped ought not to be purchased at all, but worked on lease, as most of them were in this country, so that capitalists should not be required to fill the pockets of crafty mine manipulators for the privilege of embarking in speculations where all might be lost. If mining properties had been selected on their merits, and taken on lease, instead of from speculations arising from artificial embellishments and pretence of figures, which sound more like poetical romance than sober English business prose, we should not have been tortured with the wall of disappointment which went out shrill and reverberating from the depth of too many English hearts.

It is by no means flattering to our national acumen to have been uniformly beaten in business transactions when all the advantages essentially lay on our side. We had—or ought to have had—the experience, and money was king. But we ignored the one and sacrificed the other: ceded, so to speak, to the suppliant, and allowed him to wield the sceptre which should have given him law. Business in all its relations requires vigilance, and none more so than mining, and of mining foreign enterprises demand the greatest share. There are a variety of considerations why this should be the case. In the first place, foreign fields are distant, and more, as a consequence, has to be taken on credit concerning them—that is to say, that more depends on individual judgment and integrity than is usual in home mining. That of itself would be a sufficient reason why more than ordinary deliberation should characterise the action of individuals in respect of such enterprises. In the second place, most of the districts in which foreign mining is carried on are new and comparatively undeveloped, and therefore relatively, or referably, are without character, so that nothing can be inferred concerning them except from similarities or analogies, which may be remote both as to time and place. To these may be added the frequency of disruptions which have taken place in continental countries, and the nature of the rocks, abruptly forced up in some instances, and the consequent confusion attendant on such occurrences. A fortuitous concurrence of circumstances may sometimes conduce to a brilliant, and if not carefully considered deceptive, display of gaudy wealth; and when to these is added the careful dressing of cunning and unscrupulous men, who spare neither energy or expense to succeed in their nefarious purposes, it must be apparent that all dealings under such circumstances should be conducted on strictest business principles, and nothing accepted as an equivalent for the absence of tangible values, except those features which the judgment recognises from past experience, as comparatively unerring; and these should be estimated with a greater or less allowance, according to other circumstances.

It need hardly be added that foreign mining, however well conducted, is necessarily more expensive than home mining, and being beyond the immediate control of the home directorate a liberal margin for all contingencies should be provided and observed in the estimates. But if there are disadvantages connected with foreign mining, as compared with similar pursuits at home, there are also advantages which will far outweigh those which may be set against them. The stability of value of the precious metals as compared with the ordinary metals of commerce is a consideration in respect of foreign mining which, if duly estimated, would counterbalance many minor disadvantages.

LANCET, Sept. 2.

GOLD MINING IN CENTRAL AMERICA.

SIR.—Will you kindly publish in the next number of your valuable Journal the following information regarding the gold and silver mines La Corozal, Prodigiosa, Guaranal, Barrios, and San Bartolo, situated in the district of San Miguel, Republic of San Salvador, Central America, of which I am the sole proprietor.

JOSE MIGUEL MACAY.

Regal Hotel, Bluefields Bridge, London, Sept. 11.

Information and Reports regarding the Gold and Silver Mines La Corozal, Prodigiosa, Guaranal, Barrios, and San Bartolo, situated in the district of San Miguel, Republic of San Salvador, Central America:—

In September last year I communicated with Messrs. John Taylor and Sons, civil and mining engineers, of No. 6, Queen-street, place, E.C., for the purpose of submitting to them a report on the formation of a company, in order to work on a grand scale the above-mentioned mines. (See Letter No. 1.) These gentlemen gave the necessary instructions to their agent, Capt. N. C. Morcom, who at once proceeded to the mine to examine and report upon them, and on his return to London, after having carefully examined the report under date April 19 last (marked No. 2). The samples of ore of all the mines extracted under his supervision are in the office of Messrs. John Taylor and Sons, of 43, Lime-street, E.C., and from these I have selected the mineral assayer and analyst, selected the quantities required, and gave his report on May 7 (as per his Letter No. 3). I have two other certificates of assays from Messrs. Johnson, Matthey, and Co., of Hatton Garden, and Harris and Co., of 6, Queen-street, place, London, (annexed Nos. 4 and 5), both giving very good results of the mineral.

By the enclosed Letter of Messrs. John Taylor and Sons (marked No. 6), as well as by the other letters, certificates of assays, and report of Capt. Morcom, it will be seen that the prospects of gold in these mines are very great.

Two considerations have decided me not to carry out any plans regarding the formation of a company—1. That on account of the present state of the market I did not consider this the proper time for it; and, 2. Because I wish to convince practically the public of the excellent results to be obtained before I take another step in that direction.

To this effect I have ordered from Messrs. Fred. Barnes and Co. improved machinery and utensils, to the value of about 3000*l.*, which very soon will be fixed and added to that which I have already on my property, and I feel quite confident that in six or seven months I will be able to ship to this country large consignments of reduced mineral, and prove that it will yield immense profits as soon as extensive works underground are completed.

It is my intention to publish in this Journal all the account sales of the mineral I ship, thus giving undeniable proof of the great value and future prospects of my mines. The plans of my property, as well as the other legal documents of ownership, and certificates of being free from mortgage, are in my possession.

I may add that I will be happy to give further information to anyone wishing to obtain it.

JOSE MIGUEL MACAY.

London, Sept. 11, 1873.

6, Queen-street-place, London, Oct. 1, 1872.

SIR.—We beg to acknowledge the receipt of your cheque for 120*l.*, and your draft on Messrs. Ybáñez and Henríquez, Paris, at 90 days sight for 280*l.*, amounting together to 400*l.*, in payment for an inspection and report upon mineral property in Salvador, Central America. We have instructed our agent, Capt. Morcom, to proceed to the mines, and he will sail in the steamer leaving Southampton for Colon on Wednesday, Oct. 2, and will proceed from there with all due dispatch to La Unión, and thence to the mines, where he will remain, if required by you so to do, for a period not exceeding six weeks. He will, on completion of his examination of the mines, hand to you such a report upon them as he is able to frame, in the absence of complete and reliable assays of the various ores obtained from them. On his return to England he will submit the same to us, upon which we will furnish you with our opinion and such suggestions as may occur to us. And we shall have pleasure in testifying to the capability and integrity of Capt. Morcom, who has been in our employment for many years. It is understood that the above-mentioned fee includes Capt. Morcom's travelling expenses to La Unión and back, and from the time that he lands at that port until he leaves it again; his expenses are to be defrayed by you. And it is further understood that in the event of Capt. Morcom's death, or the non-completion of his examination and report, a sum of 50*l.* (in addition to the 120*l.* already received by us) shall be paid to his representatives, and the remaining 280*l.*, when the proceeds of the bill on Messrs. Ybáñez and Henríquez are in hand, shall be returned to you. JOHN TAYLOR AND SONS.

J. M. MACAY, Esq.

No. 2.

London, April 19, 1873.

GENTLEMEN.—I beg to hand you my report on the mines of Mr. Macay, of San Salvador:—

Situation.—These mines are situated in the department of San Miguel, and about 15 miles north-west from the City of San Miguel, which last is about 45 miles from the Port of La Unión, in a north-westerly direction.

Terrain.—The usual means employed are ox carts, which carry from 10 cwt. to 12 cwt. per team of two oxen in the dry season, at a cost of 8*l.* per ton for ordinary goods, but heavy pieces of machinery would be much heavier, as the carriers do not like to carry heavy articles of any kind. The mines cannot be much over 200 ft. above the Port of La Unión, consequently there is but little ascent. Nevertheless, the roads are for the most part over and around the hills of this broken volcanic country. In the dry season, machinery to the weight of several

tions on strong wagons, with a great number of oxen, could be carried to the mines by repairing the roads at places. The roads from San Miguel to the mines are in the hands of the Union to San Miguel, and would require to be repaired at several places before any heavy machinery could be brought to the mines, at a cost of at least \$400 to \$500, inclusive of repairs, from La Unión to San Miguel.

Machinery and Buildings.—The machinery consists of one 12 in. horizontal engine, 13 in. stroke in cylinder; it draws the water from the engine shaft 10 fms. below the surface, with a 7½-inch working lift, new. The engine is in good condition. The boiler attached to the engine is 12 ft. long; diameter, 4 ft. 6 in.; top, 2 ft. 6 in.; thickness of plate, 3 in., in good condition. Also one 1½-inch horizontal engine, 2 ft. 6 in. stroke in cylinder; fly-wheel, 5 ft. 5 in. diameter, 1 ft. 5 in. wide; centre shaft, 5 in. This engine drives a mill of five heads in one battery, and four amalgamators, and other shaftings for pumping water to the calciner. The stamps and amalgamators are worked by belts from the fly-wheel and other drums. The stamps are on the Californian principle—axle, 4½ in. round; lifters, 3 in.; heads, 8 in. The engine is in good condition. The boiler is 14 ft. 6 in. long, 3 ft. in diameter, 24 tubes 2½ in. in diameter, and is also in good condition. The pitwork consists of fifteen 7½ in. pumps 8 ft. long, one working on head, and one on foot, and two door-pieces, with valves, and buckets, rods complete. There are also six amalgamation pans, 6 ft. in diameter, and 11 in. deep; a small stone-breaker, three ovens, 4 ft. by 6 ft., on the old principle for roasting the sulphurates, and a new Californian calciner, erected at a cost of 760*l.* This is said to cost 2000*l.* in California. The buildings over the engines, stamps, smelters' shop, and ovens are merely large sheds, covered with tile. The huts for the men to live in are numerous, covered with tile, and well adapted to the climate. A dwelling-house, 33 ft. by 21 ft., with good doors and blind windows; storehouse 35 ft. by 18 ft., and two other dwellings, complete the buildings. The only fuel obtained is wood, which probably can be had in sufficient quantities for ordinary mining purposes. The price of firewood is 70 cents per cord of 114 ft., weighing 1300 lbs., or about \$1.10 per ton delivered on the mine; 3 tons of wood 1 calculate to be equal to 1 ton of coal. The price of charcoal is about 88 per ton.

Timber.—This article is exceedingly scarce, and cannot be obtained except from a considerable distance, and at great expense. Small timber, suitable for timbering shafts, and for stall pieces, can be obtained near the mines, and at a moderate cost.

Matrix and Lode.—The geological formation of the district is trappean, green stone, and veins of limestone.

MINES.—I will first speak of the COROZAL MINE. Here there is only one lode on which workings are to be seen at the surface; the lode has a bearing of 7° to the south of east, and underlies north at an angle of 32° from the perpendicular. It runs across the general line of hills and ravines, and is composed of carbonate of lime, quartz, blende, iron and copper pyrites, galena, gold, and silver. It varies from 2 to 7 ft. in width, regular, and well defined—a fine looking, strong, and masterly lode. The greatest depth sunk on the lode is 15 ft. from the surface. A level 24 ft. in length communicates with this shaft with No. 2 shaft, the whole of which is ore ground. The nature and character of the lode appears to be to make shoots of good ore ground, and then become poor, and make good again. It generally carries a small branch or list of mineral on or near the hanging and footwalls. The mineral ground, or shoots of ore, appear to dipping in an easterly direction. The plans and section accompanying this report will show the work done on the lode, and the situation of the ore ground. There did appear to be a piece of poor ground between Nos. 2 and 3 shafts before I dialed the cross-cuts and levels, and discovered the main lode to be standing to the south, and the present level driven only on head, and not for the underlode. The men are now out to drive on the right course, and have intersected a splendid looking lode, about 3 ft. wide, well charged with mineral. At point G, as indicated on the plan, a considerable improvement was the result of some trials I made during my stay in the country, and this has become a point of great interest in the future of this mine. Some very fine stones of silver ore are being taken out. The lode is now 5 ft. wide, strong and well defined. It is situated 120 fms. east of No. 1 shaft, and there is every probability of the existence of ores for that length at least.

PRODIGIOSA.—This mine is situated about 1½ mile south-west from Corozal Mine. The lode has a bearing of 10° south of east, and underlies north at an angle of 27° from the perpendicular, and is composed of quartz, iron pyrites, clay, and country rock, regular and well-defined foot and hanging walls, soft and sandy. An adit 31 fms. from a ravine has intersected the lode, which is from 2 ft. to 4 ft. wide. A shaft about 11 fms. from surface, sunk on the course of the lode, communicates with the level driven west of adit. Levels have been driven east and west of the adit on the course of the lode, and all ores of value from this depth have been taken away that would pay for extraction and amalgamation by the late rule and expensive mode of working. Several shafts have been put down on the shoots of ore below the adit to the depth of about 8 fms., where very good silver ores are still being taken out. There is every appearance of its making in depth, the lode being as wide and as strong as at any other point. A winze is sunk 10 fms. on the perpendicular from the adit level, from which a short cross-cut has been driven to the lode, which is about 4 ft. wide, but appears to be poor at the point intersected. The character of the lode appears to be to make good places occasionally of sulphide of silver in the quartz, consequently but little of the lode heretofore has been taken to the mill to be stamped and amalgamated. Doubtless there is a large quantity of low-ley ores that would pay well if judiciously and properly worked: the ground being easy for working but little cost is required for the extraction of the lode stuff. This lode has produced a great deal of silver, and I have not the least doubt, judging from present appearances, that it will continue long to do so. Parallel to and north from 1 ft. to 4 ft. there is a part of the same lode, which continues from the surface to the present depth of the south or main lode. It is similar in composition, with the exception of its containing a little oxide of iron. It has not been very productive of rich ores, and the greatest part of the lode is still standing. With the other sample there is a general one from this lode.

BARRIOS.—This mine is situated about three miles to the east of Corozal, in a hill that may be properly called a hill of lodes, running to the north and south, and east and west, some perpendicular, others with a little underlie, and composed chiefly of quartz, oxide of iron, iron pyrites, and country rock. The lodes in general are large, from 2 to 6 ft. wide. It was formerly worked by the Spaniards for gold and silver, and more recently by other parties with the same object. Several places have run in from surface, but there are still many parts open where levels and winzes have been driven and sunk on the lodes, where I have taken several samples, and found them to yield fair results for gold. Quartz could be broken and delivered to a mill near the mine at a cost of about 3*l.* per ton, and stamped, calcined, and amalgamated for about 8*l.* to 8*l.* per ton by water power, which is also a fair price for the lode. Previous to the erection of any millinery at the Barrios Mine, I should strongly recommend the crushing of a great many tons of quartz from the various lodes in order to prove if the mine is worthy of the outlay of bringing in a watercourse or least to the same, which will necessarily, in consequence of its great length, be a very expensive undertaking. The ores from this mine do not appear to be very rich, and probably would not pay if stamped by steam-power. The lodes are most productive at the junctions; the old workings discovered there, as they did but little comparatively at other points.

THE MIGUELITO LODE is about ½ mile to the south of Barrios. The ore is outcropping to the surface, and is composed of quartz, iron pyrites, and country rock, with some copper pyrites, and is of a fine quality. The course of the lode is east and west, and it is composed of quartz, iron pyrites, and iron pyrites. This is a kindly looking lode, and may probably improve in depth, and is, in my opinion, worthy of a fair trial.

At a short distance from Barrios there is a level lode from 2 to 3 ft. wide near the surface, producing good stones of galena. It has a very good appearance, and is worthy of a fair trial.

THE GUARDAMAL LODE is situated about six miles west of Corozal, bearing north and south, on level about 1 ft. in a ravine. There are large quantities of quartz, iron pyrites, and country rock, which is a fair trial of the lode. The lode is outcropping to the surface, and is composed of quartz, iron pyrites, and country rock, with some copper pyrites, and is of a fine quality. The course of the lode is east and west, and it is composed of quartz, iron pyrites, and iron pyrites. This is a kindly looking lode, and may probably improve in depth, and is, in my opinion, worthy of a fair trial.

SAN BARTOLO MINE is situated about ½ mile north of Guardamal, and is a parallel lode to the above, at about from 5 to 8 yards from it. It underlies a little to the east. An adit level or cross-cut from the side of the hill has intersected the lode about 10 fms. from the surface, but it being choked at the mouth I was not able to enter and examine the lode. I only saw the lode at the surface, and some stones of quartz which came from below, which resemble that of Guardamal. The quartz from this lode and the Guardamal could be delivered to the mill at 3*l.* per ton.

GENERAL REMARKS.—According to present prospects the Corozal Mine is of great promise; the discovery of ore ground during my stay there, which was not known to exist before, is a great addition to the interest now in the property. Taking into consideration the very little work done, and the depth of only 15 fms. from surface, it may be said to be new, or a virgin concern. The same remarks will apply to the mines in general. I have tried several samples from the lode according to the best means at hand, and obtained very good results indeed. By assaying the samples I forwarded you will ascertain the real value of the ores from the lode. The greatest depth sunk on the lode at the Prodigiosa Mine is about 15 fms.; the shoot of rich ore ground has not been extensive in length, but doubtless there is a great deal of low-ley ore that would pay well if treated properly. The ore from this mine can be carried to the mill at Corozal for 6 cents per ton, by repairing the roads and putting bridges over the ravines, all of which could be done for a very small sum. The water in the mine is very little, and can be easily kept by a horse-wheel. The Barrios set is of an exceedingly interesting character; the situation of the mine is very favorable. An adit level from the river of 150 fms. in length, on the course of one of the east and west lodes, can be brought in, which would give back to the height of 36 fms. There are several lodes visible, all of which contain more or less of gold and silver, and it is probable the adit would intersect them. From the adit level cross-cuts could be driven at various points in order to prove the lode at different places. About 22 or 24 years since General Gerardo Barrios, the then President of the State of Salvador, former company with the house of Barrios, for the purpose of settling the mining rights of the Barrios Mines. Machinery to the value of \$30,000 was sent out, but never reached the mine, the company having failed previous to its arrival. A large water-wheel was included with the machinery. I have surveyed the ground, and find that 10 to 11 yards of fall can be obtained by going up the river about 2740 yards; no dam is necessary. Water-power is also obtainable close to the Corozal Mine to the height of 20 ft. by building a dam in the river to the height of about 15 ft., and a last about 1200 yards, at a cost of material and labour from \$7000 to \$8000. This would be of immense value to the Corozal, Prodigiosa, Guardamal, and San Bartolo Mines, a good fuel for iron is not too plentiful, and the mines and the furnaces for calcining would require a large quantity. The labour question is a very serious one, as the native labour obtainable is quite inadequate to working these mines on anything like the scale they should be worked. Common labourers are paid at the rate of from 37 to 50 cents per day, and considering the small amount of work done, I consider it the dearest labour I ever saw. The scarcity of timber, too, which I have before referred to, is a great drawback to the successful working of these mines; lime is also at \$10 per ton, salt 25 cents per ton for calcining purposes. The Port of La Unión is said to be the best port in Central America, but there is no wharf or quay in which vessels can lay, consequently all freight is discharged into boats and thence taken ashore. In the course of two or three years it is expected that a tramroad will be constructed between La Unión and the City of San Miguel.

POSTSCRIPT.—I may add to my remarks on the Corozal Mine that the lode contains a fair quantity of lead and blende (say) 10 per cent., and this has been found

by assay to be rich in silver and gold, whereby the value of this property is considerably enhanced. It is impossible to give any estimate of the quantity of ore which might be raised in a given time from the Corozal Mine, as it is yet quite undeveloped; but, judging from the little work that has already been done, I should say that large quantities of ore might be produced at a good profit. With regard to Barrios Mine, I may say that quartz of unlimited quantities can be broken containing a good percentage of silver and gold. Referring to my observations on continuing may suggest that for the main-roads iron might be substituted for wood.

N. C. MORCOM.

Messrs. JOHN TAYLOR AND SONS, 6 Queen-street-place, London.

The mines in San Salvador, the property of Mr. MACAY:—

MARKS OF SAMPLES.

S.L.P.—South lode, Prodigiosa Mine. The ores from the south lode are in the bottom of the sack. The ores from the north lode are in the same hide, in a cotton bag, and are in general of a less value than the south lode.

L.L.—Lead lode, near Barrios Mine.

O.P.M.—Ores prepared for the mill from Barrios Mine.

G.S.L.—A general sample, as taken from the lode, in Barrios Mine. Both samples in the same hide, in cotton sacks; each has its ticket within. There is a small sack with the ores from Barrios Mines, taken from a vein on the surface, apart from the others. The ores from Prodigiosa have the mark on the hide No. 1.

G.S.Z.—A general sample from Corozal Mine, as prepared for the mill. Hide No. 4 contains selected specimens from Barrios, sack marked B; also from Corozal, sack marked C; also from Prodigiosa, sack marked P. In hide No. 5, at the bottom of the hide are the ores from Guardamal, from the east side of the lode, which is the best. In a cotton sack, G.R., are some stones from the west side of the lode, near Barrios. Hide No. 6 is a general sample, taken from the Corozal Mine, from the slopes between No. 1 and No. 2 shafts, and is supposed to be richer than the sample in hide No. 3. This is also a sample taken a month later. In this same hide, No. 6, is a cotton sack with some specimens from the shaft G, and marked on the plans of Corozal. No. 7 is a box, with a large stone from the Corozal lode, and rich, fine stuff.

No. 3. Assay Offices, 6 and 7, Coleman-street, London, May 5, 1873.

GENTLEMEN.—I have examined Mr. Macay's samples of silver ore from San Salvador, and find the following to be the results per ton of 20 cwt.:—

Hide No. 1, Prodigiosa Mine, two samples.

Mark. South lode, loose ore. Silver 37 8 0 Gold 0 2 4

North lode, cotton bag. Hide No. 2, Barrios Mine, three samples.

General sample, as broken from the lode. 54 14 0 Ores prepared for the mill 37 1 0

Ores prepared for the mill 25 19 0 Taken from vein on surface 25 19 0

Hide No. 3, Corozal Mine, one sample. Ores prepared for the mill 32 16 0

Hide No. 4, four samples. P.—Selected ore, Prodigiosa Mine, 106 9 0

B.—Selected ore, Barrios Mine, 422 13 0 C.—Selected ore, Corozal Mine, 359 17 0

Lead lode near Barrios 14 4 0 Hide No. 5, three samples.

Guardamal, east side of lode 8 16 0 Guardamal, west side of lode 6 17 0

Miguelito, near Barrios 8 16 0 Corozal Mine, from slopes between No. 1 and No. 2 shafts, supposed richer than Hide No. 3.

From shaft G on the plan 30 4 0 Two picked parcels of mineral.

No. 1, Corozal 769 0 0 No. 2, Corozal 777 0 0

Messrs. W. LE LACHUEUR AND SONS, 4, FINE STREET, LONDON. F. CLAUDEY.

No. 4. Assay Offices and Ore Floors, Hatton Garden, London, Sept. 7, 1872.

CERTIFICATE OF ANALYSIS. We have carefully analysed the sample mineral marked as under, and find the following to be the proportions in every 100 parts:—

Mark of sample.

A 1. Peroxide of iron 5.490 Lead 29.040

Copper 1.140 Zinc 33.500 Silver 1.155

Gold 0.252 Sulphur 33.500 Water 3.500

Earthy residues 2.390 Loss 0.075=100

The proportion of fine silver is equal to 377 ozs., and the gold to 76 ozs. per ton of 20 cwt. of ore. JOHNSON, MATTHEY, AND CO.

Messrs. LE LACHUEUR AND SONS.

No. 5. Smelting Works, Isle San Lorenzo, Callao, Peru, April 12, 1872.

We hereby certify that four samples of ore delivered to us by Mr. Macay, of Panama, from Salvador, contain—

No. 1. Silver 941 Gold 25 No. 2. Silver 593 Gold 16

No. 3. Silver 71 Gold 19 No. 4. Silver 2107 Gold 62

per ton of 2240 lbs. HARRIS AND CO.

6, Queen-street-place, London, May 13.

SIR.—With this we beg to enclose Capt. N. Morcom's report upon the mining property in the department of San Miguel, in the State of Salvador, which he has visited and inspected, in compliance with your arrangement made with us in October last. He appears to have devoted great care and close attention to the instructions which we handed to him. He has presented to us a full description of the mines, and of the country in which they are situated, and he has also stated the facilities for mining which the place affords. His description has convinced us that there is a very fine field for profitable mining in the property which is held by you in the department of San Miguel. The veins are numerous—several of them are of large size—and apparently regular in their direction and their dip, and, considering the small depths to which the workings have yet been carried, they yield ores of a very promising kind, and some of them are very rich in silver and in gold. Capt. Morcom selected samples of the ores from a great variety of places in the mines, and packed them up in hide bags, and sealed them before leaving the mines. They were delivered here to Mr. F. Claudey, the eminent assayer and analyst, and his assays (of which a list is annexed) show that some of the ores are sufficiently rich to pay the transmission to this country, and that others are of sufficient value to pay well for reduction upon the spot. The mines held by Mr. Macay can be worked with a very moderate outlay of capital. The preliminary works, such as houses, workshops, two steam-engines, calcining furnaces, and some amalgamating pans are already provided. Extended workings underground, and an increased quantity of machinery are not required, and an increased return from the mines will very soon follow. The plan of working which we venture to recommend for your adoption is to select the richest ores by hand, and to ship them to Liverpool or Swansea for sale, and to allow the second-class ores to accumulate until you have a sufficient quantity to justify the erection of reduction works upon a large scale. We should further recommend you to employ mining agent well skilled in the mining of silver and gold ores, and to throw into the development of your mines all the energy which we believe them to deserve.

J. M. MACAY, Esq. JOHN TAYLOR AND SONS.

GOLD FIELDS OF NOVA SCOTIA.

SIR.—The following are the mill returns for the months of June and July, 1873. (Official data):—

SHREBROOKE.

Mill. Month. Tons. cwt. Ozs. dwts. grs.

Palmerston June 198 0 203 15 0

Ditto July 379 10 395 0 0

Meridian June 292 10 109 2 10

Ditto July 245 0 74 5 0

Union June 52 0 58 0 11

Ditto July 115 10 120 0 8

1282 10 930 3 5

MONTAGU.

Lawson June 30 12 135 4 0

Ditto July 32 16 78 9 0

63 8 213 13 0

TANGIER.

Forrest's June 44 0 48 12 0

Ditto July 48 0 34 10 0

92 0 83 2 0

STORMONT.

Nil. Nil. Nil.

WAVERTLEY.

McClure June 101 0 68 0 0

Ditto July 42 0 36 17 0

143 0 104 17 0

GAY'S RIVER.

McDonald May 200 0 29 9 13

Ditto June 300 0 38 13 0

(Alluvial.) 500 0 63 2 13

WINE HARBOUR.

Orient June 30 0 24 0 0

Ditto July 25 0

Mt. UNIAKKE.		Ozs. dwts. grs.	
Mill.	Month.	Tons	cwts.
Uniakke Company	June	29	15
OLDHAM.			
St. Andrew's	April	49	18
Napier	May	34	8
Ditto	June	45	3
		129	9
RENFREW.			
Onhir	June	26	0
Ditto	July	64	0
		90	0

NOTE.—13 tons 10 cwt. crushed in the St. Andrew's mill, in April, for T. B. Donaldson, and taken from areas, 130, &c., Oldham, pure 55 ozs. 13 dwts. The crushings since then have been much better, and the deeper the shaft is sunk the better the quartz. Some crushings lately have given as high as 7 ozs. to the ton.

The above report was received by last Friday's mail, and will, doubtless, interest readers of the Journal.

EMMA MINE.

SIR.—A correspondent in San Francisco writes me regarding this mine—August 2: Your remarks on mining have a great deal of truth in them. Of course you have been bit in the Emma, and feel sore; but was it not considerably the fault of your own engineers? We consider it so here, and think it was only a 'smart trade' in which you got the worst of the bargain. Nevertheless, all such sales are condemned by the respectable class, and only indulged in by the mining sharks. Park's reputation here would not have sold by the mining sharks. I saw Attwood's father yesterday; he says that he made a recent visit to the Emma, and that their rich ore is gone, and he thinks little prospect of getting more; that their main dependence lies in the low-grade ores, and that his son is concentrating and working them to advantage. It is a bad country for mining; the season is so short, and winters so severe.

A MINING ENGINEER.

WASTE OF COAL IN CORNWALL.

SIR.—Some few years since considerable excitement was created by a paper read before the South Wales Institute of Engineers, wherein it was stated that in the carrying on of the ordinary industrial processes of the country only one-eighth of the heat which the coal consumed is capable of yielding in the generation of steam was utilised, and very little has since been done to alter this lamentable position of affairs. The recent depressed condition of Cornish mining enterprise, however, has once more directed attention to the subject, and if the result be to bring about anything like the economy which was admitted at the South Wales Institute to be possible, adventurers may even have to congratulate themselves upon the temporary suspension of profits which they have had to submit to. The manner in which the subject has been brought forward is not perhaps the most desirable, because it charges the officials with neglect of duty without pointing out exactly wherein the neglect lies; but if the result be to save only half the coals at present wasted, complaint need not be made of the mode in which the question has been raised. It has been said with much truth that the state of the machinery in a mine is an index of good or bad management, but it should be remembered that in many cases very inefficient machinery is provided upon mines because the adventurers themselves are so limited for funds that they are unable to provide better.

Now, if an engineer has a second-hand engine, which was, perhaps, but second-rate when first-made, it is useless to expect him to obtain the same results which he would be able to get with an engine of the best construction and in the best working condition, and the notion that every engineer should be examined for a diploma before being entrusted with an engine appears simply absurd. As to insisting monthly upon a written report of the coals, &c., consumed by each engine at each mine, and the duty done therewith, it would, doubtless, be valuable, provided a system of regularly testing the coals were instituted. I believe the Cornish assayers would give an assay noting the evaporative power of any particular sample of coal for the same price as is now charged for an assay of copper ore, and with this note for a basis the monthly reports would really be worth studying; but to say that one engine does a certain duty with the consumption of a ton of coals, and that another does so much more or less with a ton, without affording any indication of the relative quality of the coals, can afford but little real practical information.

As to the wetting of coals used in the firing of steam-boilers, I think the loss is much over-estimated, although I certainly would not advocate such wetting. It is remarked that in many mines under the sanction notably of Cornish engineers the coals used for heating the boiler or boilers are wetted, under the impression that wet coals burn better and more economically than air-dried coals, and that they develop more heat by the hydrogen of the water assisting the combustion. It is added that it is quite natural that wet coals should burn almost as slowly as freshly felled wood, as the water has to be evaporated before any active formation of flame can be developed, and that this slow progress of combustion is called economy, although as for economy of fuel it is altogether out of question, as for every pound of water contained in the coals it requires for its evaporation just the same amount of heat as 1 lb. of water in the boiler. The amount of heat expended upon the evaporation of the coal water is, however, lost to the boiler water, so that the boiler produces all the less steam. This is, however, not the only disadvantage arising from wetting the coals. A second disadvantage is that in throwing in the wet coal the heat of the furnace is materially reduced, and thus imperfect combustion supervenes for the time, which leads to an enhanced consumption of fuel.

Now, this is only very partially true in practice, whatever it may be in theory. If the construction of the furnace were absolutely perfect there might be the alleged disadvantage in wetting the coals; but as most furnaces are so constructed that the coal does not get a sufficient supply of oxygen, the oxygen from the water would be rather advantageous than otherwise. But there is another point which should be settled before people talk so loudly of the evil of wetting coals. Let them throw water as much as they please upon a ton of coals as ordinarily delivered (with slack or duff it will, of course, be different), and re-weigh them in half an hour. They will be surprised at the small difference in weight, and will probably be less noisy afterward. The authority (?) already referred to states that the objection is brought forward that "when fine coals are wetted fewer pieces of coal fall through the furnace unconsumed, and the advantage derived therefrom appears to me to be greater than the loss of heat which results from the use of wetted coal." And he adds that if the furnace be constructed in a proper manner for the fine sort of coal no very considerable quantity of unconsumed coal can fall through. With unwetted coal about 2 to 3 per cent. of unconsumed particles will be found in the ashes; with wetted coals, however, only 1 to 2 per cent., so that the difference only amounts to 1 per cent. of the weight of the coal consumed. This might possibly be true under certain exceptional circumstances, but as a matter of fact furnaces are not usually constructed to burn fine coals, and when they are so constructed they certainly are not the best adapted for burning ordinary coal.

Next we have the direct assertion as to the economy in the statement that "the proprietor of a factory in Germany willingly afforded access to the boiler-shed; they poured water over the coal with a fire-engine, in the same manner as though they had to put out a fire. The coals were inundated with water, in the firm and immovable belief that the coals would burn better and give out more effective heat. If this had been petroleum or tar, I would not only believe, but assuredly know, that the coals would produce a more intense heat than when the enemy of fire—water—is introduced. The fireman at this factory told me that when the consumption of steam was great the steam of four atmospheres would usually recede suddenly to one atmosphere, and that they could only obtain an increase

of pressure by throwing unwetted coals into the furnace. The advice given by me to the proprietor of the factory not to pour water over the coals did not remain unheeded, for a few days afterwards they no longer consumed, as before, 80 tons, but 66 to 68 tons of coal per diem."

Now, how anyone making such statements as these can reasonably ask his opponents to bring forward facts, unless, indeed, it be because he is desirous of knowing what a fact is, I am at a loss to know; for anyone who has ever seen either a boiler or a furnace well knows that the sudden drop from four atmospheres, or 60 lbs. on the square inch, to one atmosphere, or 15 lbs. on the square inch, is not caused either by damping down the fire for the night or by drawing it altogether. The proviso—"when the consumption of steam was great"—is not a sufficiently compensating element; and the statement that 67 tons of unwetted coal will do the same work as 80 tons of wetted is equally open to question. But, stop, I see that he does not say that the same amount of work was done, so that the reduced consumption mentioned may have resulted from less steam having been required.

As to buying coals by dry weight, like copper, I can see no objection, and it would probably be equally satisfactory to the purchaser and to the merchant. The question as to how much of effective percentage per ton is lost when coal is allowed to accumulate in wet, sultry weather as compared with a ton of coal taken dry from the pit's mouth is an important one; but in answering it, it must be remembered that the loss of efficiency does not arise from the wetting, but from the generation of heat in the heaps. The other questions raised are only such as are answered in every elementary work on the steam-engine.—Sept. 8.

ENGINEER.

PEAT AS FUEL—No. III.

SIR.—Since writing to you last week I have been favoured by Messrs. Clayton and Co., of the Atlas Works, with copies of several letters received by them from different countries, amongst which one from Sweden, showing that, notwithstanding the existence of large forests in that country, the value of peat is not by any means underrated in the Scandinavian Peninsula. This letter shows the great anxiety with which thoughtful men in that country look upon the future of the iron smelting trade, and how much they deplore the gradual destruction of forests, although, in point of fact, no more than a given number of trees are allowed to be cut down every year by ironmasters in Sweden. From this you may also conclude that the great importance I attach to the production of peat charcoal is not by any means exaggerated.

The main difficulty, however, does not lie in the problem of proving that peat fuel is excellent, but rather in finding means of producing such fuel on a large scale. Peat charcoal cannot be prepared from the raw material without an intermediate process, for in that case it would be exceedingly light, have no cohesion whatever, and consequently could never sustain the pressure of a layer of iron ore and fuel 70 or 80 ft. in height. On this ground raw peat, prior to being converted into charcoal, must be subjected to a treatment, at the conclusion of which the mass would not contain more than 20 per cent. of water; even then it will be very light, in fact, too light to bear the cost of carriage for any long distance, and must, therefore, be done on the spot where it will be used. With a view to remedy this drawback, it has been proposed to condense the mass by means of hydraulic pressure; but it was found that peat is not easily compressed; that heavy, powerful, and expensive machinery is required for its compression, and still very little good is effected by this. The mechanical appliances which have been resorted to for this purpose are very numerous and varied in character. I do not mean to review them all, the more so that many of them are not even worthy of notice; but I will just say a few words about some of them.

As far back as 1845 a machine was exhibited at work in the neighbourhood of Dublin, invented by the Rev. Edward Cobbold, for separating the fibre from the peat, so as to get a residuum of great density when thoroughly dried. This was a sort of centrifugal machine, such as is used for separating crystallised sugar from the molasses. The peat in a semi-fluid state, arrived at by previous maceration in water, was placed in the machine, the rapid revolution of which caused it to pass through the holes in the drum, the fibre separate by this process being taken out before a fresh supply was placed in the machine. The semi-fluid mass of peat, thus divested of every particle of fibre, would run into a tank close by, from which, after being slightly consolidated by the evaporation of a portion of the moisture, it was afterwards taken out and cut into small rectangular blocks, which, when thoroughly dried, were possessed of great density, and formed an admirable fuel. So far as the quality of the product is concerned, this plan left nothing to be desired; but a more practical consideration of the matter would have enabled the inventor to see that with the labour employed in carrying out such a process, and the difficulty of thoroughly drying a large quantity of such a plastic material, the cost of production would by far exceed the returns, and that, consequently, his method, though excellent in theory, must fall through in practice.

In 1851 certain products derived from Irish raw peat were exhibited at the offices of the Irish Peat Fuel Company, in the Strand. Besides the products of distillation, as oils and paraffin, there was a beautiful fuel, with an ebony look about it. The exhibitors had been using compression as a means of producing peat fuel, but after incurring considerable expenditure on operations carried on in the county of Kerry the result was a most egregious failure, and the difficulties which they encountered seemed to warrant the conclusion that the idea of preparing peat fuel by compression was entirely visionary.

Mr. Rogers, of Dublin, has also devised a very elaborate process for the utilisation of peat as fuel. The main features of his plan are as follows:—A system of wooden sheds, open on each side, but covered over by a kind of roof through which water cannot penetrate, and being flexible, so as to fall down a little way on each side. These sheds are moveable, and the peat coming from the pools is placed in them, cut into small blocks, and allowed to dry for two or three days. After this it is removed in wooden troughs or wire baskets, which are set up in piles in another set of sheds, which may be wheeled about on rails, or moved in some other way. This set of sheds is then taken to the place where the last drying operation is gone through. The blocks are taken out of the baskets and piled up like bricks in a kind of large brick oven, inside which rails are placed supporting a set of furnaces, or closed ovens, in which the peat that is to be turned into charcoal is carbonised, and gives sufficient heat to dry the peat fuel placed around. These are the leading features of Mr. Rogers's system. It may be seen how complicated it was, what amount of labour it involves, how large the drying-sheds must be for making (say) 100 tons of peat fuel in a day.

Many other processes have been devised in England, France, and America, and patented by the hundred every year, but the majority of these inventions are by this time consigned to the limbo of the patent files, beyond which few of them ever advanced. Those that have been tried have yielded no results, save a considerable amount of expenditure without any return. Some inventors have thought of mixing tar with peat, whereby they might be able to produce a fuel more compact and heavier than that produced by other means; but being obliged to have the raw peat pulped and dried to some extent before they can produce that mixture, they only added another item to the already excessive cost of production of peat fuel, and no success whatever can attend their various "improvements." I have seen some beautiful specimens of peat fuel thus prepared, but I do not believe that they are good for anything but display. Some months ago a company was started in London under the name of the Anglo-Swedish Peat Ball Patent Fuel. The prospectus stated that they intended to acquire the right of using Eichorn's patent machine for condensing peat. In Eichorn's machine the peat is shaped into balls of irregular size, which are said to be smokeless, clean, and superior to coal—in fact, the *no plus ultra* of fuel. About this method I am not prepared to say anything at all, for, according to the laudable habits of certain companies, no information about it has been vouchsafed to the public. Another company of the same kind, and started for the same purpose, is now in course of formation. The process it is designed to work is stated to be a French

one, and has been worked for a long time at Montanger, in France. Of the process I cannot say anything now, but I will try to obtain information. As far as the products are concerned, all I can say is that they are beautiful.

A. VASSARD.

25, Finsbury-place, London, Sept. 10.

ARTICLES OF ASSOCIATION.

SIR.—It has occurred to me that it is desirable, in present circumstances, that attention should be directed to the above subject. Many companies have been formed, and are now in operation, with "Articles of Association" of which the great mass of the shareholders are entirely ignorant. The consequence of this is that when something objectionable in the management, or expenditure, is remarked upon at the annual meeting of the company, or in other circumstances, the mouth of the objector is stopped at once by the reply "Oh! that is in conformity with the Articles of Association." I have no desire to refer to any company in particular, but the truth seems to be that not a few concerns in these days are started for the benefit of "promoters," and of "directors," who being self-elected and irresponsible, in terms of their so-called "Articles," take care to "feather their own nests," and then leave the shareholders, who have advanced the money, in anything but a satisfactory condition.

Is there no remedy for this? It is no sufficient answer to say that the shareholders have themselves to blame, and that they ought to have examined the Articles of Association before subscribing for shares. For individuals often act thoughtlessly, and have to be protected against themselves, and to require them to go to a distance, or to employ others, for the purpose of minutely examining the constitution of projected companies, of which they may have formed a favourable opinion, is not so reasonable as it might at first sight appear. Moreover, there are many persons arriving in this country from time to time from abroad, who are often led to apply for shares in proposed companies without adequate information regarding them.

Now, I have to suggest that a very simple, and to some extent at least effectual, expedient would be to have it provided, by Act of Parliament if necessary, that all joint-stock companies shall transmit to their shareholders a copy of their Articles of Association, and that, in the case of new companies, this shall be done when allotment letters are issued, and that it shall be in the option of parties to whom allotments have been made to withdraw from the company within a certain time, and to receive back any payments they have made, should they be dissatisfied with the Articles of Association. This would be a check on certain "promoters" and "directors," of which they are very much in need.

Meanwhile, it would be well if some clauses in a good many existing Articles of Association were made publicly known and exposed. In a work of this kind your Journal might at present be most usefully engaged, and I hope you will think favourably of the proposal.

Sept. 5.

ONE INTERESTED.

UTILISING WATER POWER.

SIR.—It was my intention to have replied ere this to Mr. Coates' letter on the above subject, but other matters prevented my doing so. No doubt Mr. Coates' plan would do very well under certain favourable circumstances; but it would not be so universally applicable as compressed air, as it would involve in some cases a great waste of power, and would be in many cases altogether impracticable. In order to get the full advantage of the water-power we should have to select the lowest situations convenient for the purpose. Now, it might often happen that the place to which we require to convey the power would be at a much higher elevation than the place where we accumulate our water-power, which, as I have said, must be in a low situation, so that the water would have to be lifted a certain height to reach the required spot. Thus a large portion, or the whole, of the water-power might be absorbed in lifting and forcing the water alone to the place where it is wanted, leaving only a small balance, or none at all, to be used as motive-power. We should, therefore, be confined to certain situations and conditions under this system, just as we are now in the ordinary applications of water-power, though not to so great an extent; for Mr. Coates' plan would still be very convenient for comparatively short distances, with little or no rise. It might also be convenient to apply it in certain cases where not only motive-power has to be transmitted, but water also, for other purposes; in which case the water having done its work in the water-power engine would be available for such other purposes. These, however, are limited applications, whereas the scope for the application of compressed air is positively without any limitation whatever for all practical purposes. The air can be compressed in a valley, and carried to the top of a mountain if required, the loss of pressure due to the height of the column of air in the pipes being comparatively little. Or it might be compressed on a hill and carried to the bottom of a mine, where, after doing its work, it would in escaping help to ventilate the mine. The power would be much more manageable, on account of the comparatively low pressure required, and might be conveyed in ordinary steam pipes, whereas Mr. Coates' system would necessitate the use of hydraulic piping of very great strength. As for the "steadiness" of compressed air as a motive-power, it would be quite as steady as steam, if not more so, as there would be no condensed water to be troubled with in the cylinder, no priming, &c. Moreover, any ordinary steam-engine would do for the motive-power engine (stripped of all the appliances specially needed for steam), and could be worked expansively, exactly as with steam.

I do not see why this system should not become largely adopted, particularly in Cornwall, where the circumstances are all so peculiarly favourable to the full development of such a scheme with the utmost advantage. The chief element in the cost would be the piping, but it must be borne in mind a steam-engine would consume in coal many times the amount of capital that would have to be invested in piping for compressed air, long before the latter would be completely worn out and rendered unserviceable; and also that in the one case, when the money spent on coal has completely vanished in smoke, in the other case the piping still remains to the good, and representing a considerable money value.

I am almost tempted to enlarge upon the effect of the general adoption of this system upon the great question of the day—the coal question; but I should be thereby opening up a subject far too extensive to be attempted in a letter like this.

JOHN STURGEON.

Burley, near Leeds, Sept. 3.

COPPER TAMPING-BAR, VERSUS IRON TAMPING-BAR.

SIR.—First and last I have seen it a great many times pointed out in the *Mining Journal* that by the use of the copper tamping-bar in tamping the holes in our mines, instead of the iron bar which has hitherto been used for that purpose, the accidents from premature explosions of holes underground would be much less frequent, or even might cease altogether. In common with many others, this appears to be the unqualified opinion of the Cornish Correspondent in the *Journal* of Aug. 30, wherein he states that "at West Wheal Jewell the employment of an iron tamping-bar has again resulted in death." In my opinion, had the miner at West Wheal Jewell tamped the hole in question in the ordinary careful way, and even employed a copper tamping-bar, the result would have been the same, inasmuch as I do not believe in the efficacy of copper bars as a preventive of premature explosions. For instance, two men go underground to work, they bore a hole 2 feet in depth, after which they clear it out, and then charge it with (say) 10 inches of powder, which is packed tightly together with a swabbing-stick. It is then usual to throw in a handful of fine tamping, which is also packed, and the hole is again cleared with the same stick. Ultimately another handful of tamping stuff is put into the hole, after which it is considered to be ready for the tamping-bar. Now, the hole at this stage in its preparation for blasting, and previous to the tamping-bar being placed into it, contains about 3 inches of solid tamping stuff on the top of the powder charge, and I quite fail to understand what difference it can possibly make whether it is then tamped with a bar of copper or iron. Why, extract the fuse, and I verily believe that the hole might be filled with fire and it would not explode.

One of the chief causes assigned for these unfortunate explosions

is, that "the fuse must have been cut while tamping," consequently it became ignited, and so conveyed the fire down into the charge. If such be the case it has often struck me why it is that of all the thousands of different lengths of fuse which are daily cut off for blasting in the mines of Cornwall and Devon with the point of a steel borer struck with force against the flinty sides of the workings, do not more frequently ignite. Setting fire to the fuse by this means is of extremely rare occurrence, sufficiently so, one would think, to cause the cutting-the-fuse theory to be exceedingly doubtful. When an explosion takes place in a mine the first questions concerning the accident are, "Where was the hole? and how did it go off?" and the answer comes almost invariably the same. "The hole was looking in, and went off with the second laying of tamping." The looking in signifies that the hole was dipping at some angle at from 30° to 60°. In charging a hole in this position after the loose fashion which careless miners sometimes adopt—that is, of not settling down the powder properly—will, as a natural consequence, cause a cavity to be formed on the upper side of the hole, and when the tamping is thrown in that cavity probably has become filled with air, which, doubtless, is subjected to great pressure during the process of tamping. Why is it that by far the greater majority of holes which explode in tamping are those "looking in?" Has the compressed atmosphere confined between the tamping and powder, as mentioned above, anything to do with it?

Camborne, Sept. 9.

CAPTAIN.

IMPROVEMENT IN PUMPS.

SIR.—Although the improvements in details which have from time to time been introduced in the construction of pumps have been very numerous, the ordinary lifting and plunger pumps have always been in most favour amongst miners, and until something very much better than anything which has yet been brought forward to oppose them be introduced they are, as I think, quite entitled to remain so. The various water-raising apparatus which have been proposed for forcing water from the bottom of the mine have all been practical failures, and the same may be said of, I believe, all the chain pumps when used for great depths; this is not because they are not economic whilst they are at work, because they are so liable to breakage—every breakage involving a long stoppage, and an annoying amount of trouble, which trouble increases with the depth. For short lifts—say, 20 ft. or 30 ft.—the chain pump is unsurpassed, and Murray's used as a contractors' pump has given a fortune to the inventor, and proved a great boon to contractors; but if that pump were used to raise water from a shaft only 50 fms deep, I am sure no one knows better than the inventor that it would prove a lamentable failure. The weight of the parts, which for the short lift is no inconvenience when multiplied to make the pump suitable for 50 fms., would preclude its adoption, it would almost break itself without the weight of the water, and would speedily be abandoned, even if it were got to work, owing to the enormous cost that would be incurred in raising the water.

But I have recently seen in Belgium a chain pump which I was assured had been working for more than three years without any repairs whatever, and which appeared to me to be for mining just what Murray's is for contractors' purposes. It is a very peculiar pump, being entirely of metal, and no attempt being made to prevent loss of water; indeed, when the engine is stopped the tube is empty in half a minute. The discs are merely flat plates of metal pinned to the chain, and so far from any attempt being made to let the discs pack to the tube, there is a good quarter inch all round—the discs being about 4 in. diameter—and the man who was attending the pump told me that they did not notice that the swing of the chain damaged the tube, and that he believed that the water between the disc and the tube always prevented the discs from touching the sides. Be this as it may, the pump seems to work well, though the chain now shows considerable signs of wear, and much water is raised—they say about 60 per cent. of the power is utilised, and declare that this is more than is really done by the best suction pumps. Now, this is about the roughest specimen of a chain pump—except the old Spanish pump with balls and sheepskins, instead of discs—that I have seen, and still it works economically, and is pretty durable. The chain is now nearly worn out, so that 100 fms. of new chain will soon be required, but if this be only once in three years there is not much to complain of. Why, then, should not the chain pump be brought more largely into use? Its economy is acknowledged, and here we seem to have freedom from the greatest objection to its use—its liability to breakage.

Manchester, Sept. 5.

PROGRESS.

THE ROYAL CORNWALL POLYTECHNIC SOCIETY.

SIR.—I notice in the Supplement to last week's Journal a somewhat hasty letter from Messrs. Thomas Brown and Co., finding fault with the remarks of your Cornish Correspondent on the success obtained by the Kainotomon Rock Drill at the late Exhibition of the Royal Cornwall Polytechnic Society, where the judges unanimously awarded me a first medal. I had, as you are of course aware, no knowledge whatever of the article in question until it had appeared in print, nor should I have thought it worth while to notice Messrs. Brown and Co.'s letter, had they not charged your Correspondent with gross misstatements. The judges at the Exhibition, who are for the most part practical engineers, and all scientific men, had the Burleigh Drill before them last year, and the drawings of that drill and the Kainotomon this year; they were, therefore, able to decide for themselves on the respective merits of the two machines, and I may say that I was much complimented by several of them on the great improvement of the drill shown this year over that exhibited last year. In reference to the remarks in Messrs. Brown and Co.'s letter, I will reply in the order in which they are made:—

1.—The Burleigh Rock Drill was brought out by Messrs. C. Ball and Co., who sold the first of these drills in this country, and acted as the sole agents for Great Britain and Ireland up to November last year. My position was that of manager to the firm, and in that capacity I sold and exhibited Burleigh Drills over a term of two years, and I only credit myself with having brought out the Burleigh Drill in that capacity.

2.—The comparison of the number of parts of the Burleigh and Kainotomon Drills may appear to Messrs. Brown and Co. ridiculous, but is certainly not false, as will be seen from the following details of the number of parts, including bolts and nuts in each portion of the machines:—

	Kainotomon.	Burleigh.
Cradle or jacket	1	5
Universal clamp	4	17
Feed	13	13
Valve and actuating parts	3	17
Valve cover	5	10
Steam cylinder	4	32
Rotating arrangement	7	21
Piston and tool holder	4	7
Total	42	134

The above may be verified by an inspection of the two drills. If Messrs. Brown and Co. can simplify the complication of the Burleigh Drill by means of reducing the number of parts, I think it would be wise in them to do so.

3.—The comparison of prices between the Burleigh, as exhibited by me last year at Falmouth, and the Kainotomon, exhibited this year, is not false and ridiculous, but perfectly correct. I enclose a circular to prove this statement. The price, at this time last year, for a small-size Burleigh Drill complete was for the machine £25, the tripod stand 10s., two 15-foot lengths of hose 10s., packing-case 1s., making in all 46s., as stated by your Correspondent. The present price of the Kainotomon complete, including tripod stand, two 15-foot lengths of hose, two steel drills, and packing case, is 88s. Since last year I believe the price of the Burleigh has been somewhat reduced, but this does not in the least degree alter the accuracy of your Correspondent's statement.

4.—As a matter of fact, the flexible piping supplied for the Kainotomon is less than half the price charged for that supplied for the Burleigh.

The statement "there is nothing particularly new in the general principle of Mr. Warrington's machine" would apply equally well to the Burleigh, it being, as your Correspondent describes, a "borer driven by a piston worked by steam or compressed air." This action

is that of all rock drills of this nature, and was used long before the American Burleigh Drill was introduced to this country. I fail, however, to see how Messrs. Brown and Co. can make out that the chief parts of the Kainotomon appear to be those of the Burleigh, as there is no resemblance whatever between the two machines beyond each of them having a cylinder and piston.

I regret that Messrs. Brown and Co. should speak of scurrilous letters issued from my office, as they can exist only in their imagination. They have made remarks in disparagement of the Power Jumper, which have come to my knowledge, but I have not considered them worthy of notice. I leave your readers to judge of the courtesy of Messrs. Brown and Co. from their letter.

King-street, Cheapside, Sept. 10.

THOS. A. WARRINGTON.

MINING IN NORTH WALES, AND ITS PROSPECTS.

SIR.—I have just been informed that my letters recently published in the Supplements to the *Mining Journal* under the above heading have offended some parties connected with mining in this part of the country. Now, Sir, one of two things must be admitted. If mining does not pay it must be because the mines, or the management, are not sufficiently good. I stated that the way the mines had been worked, and not the mines themselves, was the cause of the present comparative inactivity prevailing in this district. If others differ from me in this respect they may possibly have some reasons for doing so, but until I can discover what they are I can neither appreciate or endorse them. I am fully convinced that I had sufficiently good grounds for the remarks I made in the *Journal*; but if there are those who think I had not, would it not be well, if they feel aggrieved thereby, to controvert them through the same channel? It would look more manly than going around with the *Journal* in one's pocket, and as opportunity offered read selected passages therefrom to persons who do not understand consecutive English, but depend, therefore, upon the lucid expositions of the party appealing to their sympathy. The *Journal* may be prostituted by some individuals for base purposes, but they themselves cannot be, simply because they are already committed to act according to the impulse of temper. When the principles of mining and its collateral sciences are unknown to individuals, especially to those whose experience has been limited—possibly as much from intellectual incapacity as from the want of opportunities, or it may be that peculiarity of disposition has circumscribed the intellect—it is generally found in persons of this class that all that is available is carefully arranged on the surface, and ostentatiously displayed for exhibition, from a vivid apprehension, it may be, that without a special personal effort they would speedily merge into obscurity.

If my remarks concerning the manner in which mines in this district have been worked were unfounded nothing could be more indiscreet, or operate more effectually to sap my own reputation in the future, seeing that one of the mines which I pointed out as having been abused by the way it had been worked is now under my management; and if I fail to establish it as a legitimate paying property, I shall then have pre-judged and pre-determined my own incapacity, and to my own decided disadvantage.

I take it, Sir, that you will consider I am as much entitled to this rejoinder through the columns of the *Journal* as if my letters had been publicly assailed therein.

Llanerest, Sept. 6.

ROBT. KNAPP.

MINING IN MONTGOMERYSHIRE—No. VI.

SIR.—Leaving Aberdant Mine, and winding our way around the Crowlwyn hill, we reach the banks of the River Clywedog, which here forms the boundary between the Aberdant and the Bryntail Mines, the latter now known as the VAN CONSOLS. There is at this point a swing-bridge to cross the river, but unless the reader is strong in the nerves I would not advise him to attempt the feat of crossing by it. Close to this bridge, on the eastern side of the river, is the VAN CONSOLS BARYTES WORKS, but, unfortunately, at the time of our visit operations were suspended; therefore we continued our journey east by ascending the incline tramway, and soon arrived at the mine. VAN CONSOLS has been so often described in the columns of the *Journal*, and is, therefore, generally well known, it would be only engrossing valuable space again to describe it; but, withal, we cannot pass without congratulating the fortunate shareholders on the healthy appearance of the mine, and also expressing our great satisfaction with all we saw, everything reflecting the greatest of credit upon the astute and energetic manager, Capt. Roach.

East about a mile and we reach the PEN-Y-CLYN MINE. A few years ago this mine was a rival with the Dyliffe Mine for the laurels of being the richest mine in Montgomeryshire, but the Pen-y-Clyn of to-day is a very insignificant concern, shown doubly more so by the bright reflectors—Van and Van Consols—east and west of it. However, Pen-y-Clyn seems to be rallying a little, as we see a new water-wheel for pumping has recently been erected, and the mine underground seems to be improving. It has also recently got one of the best lead miners in North Wales for its manager, and, doubtless, under his assiduous and careful management Pen-y-Clyn will again become what it was 15 to 20 years ago—a household word in Montgomeryshire.

About half a mile east and we arrive at the VAN MINE, the "champion of England," as my guide calls it; and doubtless it is so, as its heavy samplings will attest to. Talking of samplings leads us to the dressing-floors, to see where all the lead and blende is cleaned, and here find, substantially erected, the best and most practical of all classes of machines in use, from the "German jigger" to the insignificant "lue," Capt. Williams being too astute a manager to discard the use of anything whose only fault is that it is old-fashioned, or not "patent." Everything on Van floors is in its proper place, and worked with a system and precision that astonishes even old and practical miners and dressers. To Van, then, I would advise all to go if they wish to see a real good dressing-floor. I myself have seen a great many sorts of floors at home and abroad, doubtless as many as but few, patents and non-patents, but never one that came near the Van for perfection and dispatch. The monthly reports from Van, which appear regularly in the *Journal*, and which are verified by the enormous quantity of ore sold monthly, give a far more lucid explanation as to the appearance of the underground department than anything that I might attempt to advance in its favour.

Therefore, we pass on to the CENTRAL VAN MINE, which is within a few hundred yards of the Van engine-shaft. If Central Van is not so rich as its neighbour it certainly holds an invidious position. They are here busily engaged in sinking an engine-shaft to intersect the Van lode, and from what the captain informed us they have yet a considerable depth to sink to reach the point where at starting it was supposed they would reach the lode; but from indications presented in the shaft during the last few fathoms sinking—having met with several fine branches of lead ore, intermixed with carbonate of lime, spar, &c.—speaking from analogy, they cannot be far off from a lode, if not the Van at least a parallel lode, which, being in the same channel of ground, might prove to be equally as rich as its neighbour. Irrespective of this they are working on a very promising lode, at a place called Llwyn Llwy, at the south-eastern part of their sett; a cross-cut into the hill here intersected two very fine lodes, one of which, as stated above, is being developed. The prospects here are certainly very encouraging, and deserve a vigorous prosecution, when there is little doubt as to the result.

East from here about a mile is the EAST VAN MINE. Everything here seems to betoken a large mine. A very powerful engine has been erected, which seemed to imply that they were prepared for contingencies. Very little lead is as yet forthcoming from here, but we understand that the prospects are very encouraging.

East again from here, still on the course of the Van lode, we reach the GLANGWYDAN MINE, a very promising little concern, which, from the indications presented, although not bearing the maternal name, leads us to infer that at no very future date it will be the most prolific of the Van progeny.

Still east and we reach the CYLL, now known as the LLANTIDLOS WHEAL VAN MINE. A considerable amount of work has been done here, and the shaft carried down to a great depth, but hitherto without any good results; there is, however, one characteristic paramount

here, and worthy of notice—a great quantity of gas issues from the lode. This is precisely analogous with Van, and considered by many as an infallible indication of close proximity to a body of mineral. If this, then, is any criterion to go by, they will certainly have a rich mine here some day.

About a mile south-east and we reach CWM MEGGAN sett, where we were shown two very promising and masterly lodes; but at the time of our visit very little had been done in the way of opening out.

Next week, Mr. Editor, I intend narrating the particulars of our rambles along the banks of the Severn.

Sept. 9.

PEDESTRIAN.

MINING IN SHROPSHIRE—THE BOG MINE.

SIR.—I observe that remarks are from time to time addressed to you on what appears to the writers to be the anomalous position of certain mines upon the Stock Exchange. As a dweller in the neighbourhood, it appears to me the present value of shares in the Bog Mine is as unaccountable as that of most. Of course, all mining is, more or less, groping in the dark, but if anything ever was known about a mine it would appear to be in this case. It only ceased working in 1844, consequently there are still several miners to be met with who have worked in it formerly, and they make only one statement as to the value of it, which is that there are very large quantities of ore at the bottom of the mine, and this statement is corroborated by the books kept by the then lord of the manor, which show large receipts of royalty for the 11 years during which it was worked.

To save space, however, I will only give the amount of the last year, which was a fair average: 559l. was the amount. The rate of royalty 1-15th, which at the then price of lead, about 8s. per ton, shows that the mine was producing about 100 tons per month. Now this being the state of the mine when the old workers ceased, it is clear that there is almost a certainty of things being found in the same state by the present company as soon as the bottom is reached, and this expectation is strengthened by the fact that as lower levels have been reached the mine has improved, till pitches are now set in the 148 fm. level at 5s. a ton for lead, and there can be no doubt that the bottom is now very nearly reached, and that the machinery, &c., are amply sufficient to finish the work which they have carried on so far. Notwithstanding all this, and with the chance that a stroke of the pick may at any moment double the value of the shares, they are now rather lower than they were 12 to 15 months ago, when many fathoms of water had to be pumped out, and other difficulties overcome, some of which, to say the least, were of a very critical nature. Shrewsbury, Sept. 10.

SALOPIAN.

MR. GREEN'S SELF-ACTING DRESSING MACHINERY.

SIR.—Having noticed the remarks of your correspondent, "Maldwyn," respecting Mr. Green's "Self-Acting Dressing Machinery," I beg to say that I have seen it work, and the arrangements are altogether new. I have had the most recent improvements in Cardiganshire, previous to Mr. Green's, at work at the Eagle Brook Mine, but they are altogether different, and the work done is very far inferior both in quantity and quality. I should also judge, from the whole construction and design, that with fair materials and proper fittings Mr. Green's machinery must be practically indestructible, as far as wear goes, and entirely free from breakage, and is really the only system which does its work complete at one operation. I quite endorse your correspondent "Gymro's" statement that "the mining world is much indebted to Mr. Green for the perseverance and skill that has resulted in a perfect system for dressing ore." I have known Mr. Green for these past 20 years as an engineer of first-rate ability, and so far from committing endless mechanical blunders he has more frequently corrected them. HENRY TYACK.

Fronles, Talyllyn, Sept. 8.

THE SELF-ACTING DRESSING AND OTHER MACHINERY.

SIR.—It is useless to follow "Pedestrian" and others, as I cannot see anything in their correspondence worthy of public notice. If, however, they would inform me, through the *Journal*, what quantity of ore is contained (say) in 20 tons of ore stuff when prepared for the crusher in Cae Conroy or any other mine, I could then easily show the superiority of the new system of dressing over the old one. Without having some basis to work upon, furnishing statistics is out of the question. Your readers generally know the difference in the yield of lodes, which must make a difference also in the dressing cost. According to the quantity of ore extracted from each 20 tons of stuff, must be the price of dressing the ore per ton—that is to say, the more ore contained in each 20 tons of stuff, the less time and cost it would take to make that ore marketable. "Pedestrian" enquired whether they sell the 20 tons of ore risen at Rhosyddol, or send it down the river. A good deal of ore has been sent down the river previous to having adopted the new system of dressing. Where was "Pedestrian" then? And, by-the-by, may I ask "Pedestrian" if this is the only river that has been croaking under the precious burden of silver lead, copper, and tin ore? I may here say that no metallic ore can escape these machines. This is not the case with the old machinery, as I hope to prove presently. In Wales (with few exceptions) no person is allowed to tell a manager of a mine anything of his errors without imperilling his own position, and he would be considered too dangerous a person to live in society. The writer ventilated the subject with an eminent mining manager a few years ago. It excited him very much. He would that all the slimes should be deposited in the middle of the sea. I requested him to find out that spot that I might drive it thither. Down the river it had to go, and is still going; and that will be the course until managers of mines will become wise enough to adopt more efficient machinery to prevent it. Do not working men in Cornwall take the rivers in order to re-wash the stuff thrown away from the mines? Does not the undertaking pay them well? What does this speak of the managers? How are mining adventurers so blindfolded that they do not look into their own affairs? To my mind it speaks of the superiority of the working class in the dressing of ore. Is not a simple idea to place such an important matter into the hands of a person who cannot prevent such vast amount of wealth being washed down the rivers every year? There is no excuse allowed for this, because the workpeople do well by it. It is evident that the managers should do better. What is the use of having good counsel of ore if it cannot be extracted from other matters? Many an undertaking has failed owing to the deficiency in the management of the dressing-floors. These blunders and losses, however, might now be avoided by employing the Self-Acting Dressing Machinery to do the work, as they will manage more efficiently than any manual labour employed on the dressing-floors. In fact, they will prevent any ore from running into the rivers.

Another obstacle the mines have to contend with is the heavy amount they have to pay for steam-power to work the stamping department. Cannot "Pedestrian" and Co. turn their attention to, and ameliorate this? Credit is due to those gentlemen who have improved the stamps; but it takes an enormous amount of power to do the work. But I fear writing will do no good, save provoking controversy. Well, be it so. Out of evil may come good. It is almost impossible to persuade people to put aside old habits, that have always impeded the progress of improvements. Stamps-head the people will have at home and abroad, be the cost what it may. What a power it requires in lifting such heavy clumsy weight all the day long, and what amount of gold goes up in smoke. Certainly they must have power to do the work, but the question is whether they can get the same amount of work done with half the usual power. Would that not be a great boon to mining?

There are several other pulverising machines in the field, but the one best suited for reducing skimpings into slimes is Girdwood's Reciprocating Crusher. This is capable of doing a certain amount of work per day (say 12 tons) on one-half the power that stamps will take to do it; and until a better machine is invented (if ever that will be), it will save a vast amount of money to those who have to provide steam-power to do the work. In the first place it is not so expensive in its construction; and in the second place, as stated above, it will not take more than half the power to do the same amount of work. A stream of water takes the slimes into a series

Prevention of Colliery Accidents.

Mr. HERMON'S PRIZE ESSAYS.

Mr. WILLIAM GALLOWAY'S FIRST PRIZE ESSAY—No. II.

We have now seen how that in fiery mines it is not safe to conduct the ventilation either according to the primitive method or Mr. Spedding's method of coursing the air; Mr. Buddle's system of double ventilation has also been briefly discussed; it still remains, however, to be considered when, and in what manner, any ventilating current may become explosive. Let Fig. 5 represent the plan of part of a long wall working: A B and C D are the main intake and return air-courses; a b and a' b' district intake, and c d and c' d' district return air-courses. It may be assumed that the air leaving the points b and b' is always, pure, and that the whole of the working face, x y, emits fire-damp at a uniform rate. Then it is evident that any given quantity of air which passes from b to c, or from b' to c', will always contain exactly the same percentage of fire-damp when it reaches the point c, so long as the quantity of air is not increased or lessened, and the quantity of gas emitted from the coal remains unchanged.

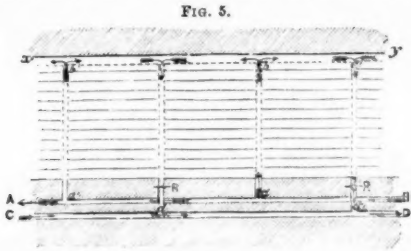


Fig. 5.

1. Let the quantity of air coming from b to c be twice as great as that from b' to c, and take the distance b c = b' c. Then, if there be 4 per cent. of gas in the current b c when it reaches the point c, there will be 2 per cent. in the current b' c at the same place. Now, suppose the quantity of air arriving at c to be halved (the relative quantities remaining as before), or the quantity of gas emitted at the face to be doubled. Then, in either of these cases the current b c will be explosive shortly before it arrives at c, the current b' c will not be explosive, and the air in the passage c d will contain 5 per cent. of gas, and will not be explosive. If, under these circumstances, ignition takes place at the point c there will only be a slight explosion of the mixture extending towards b'.

2. If the air arriving at c from each side is explosive, or if that coming from one side or the other contains sufficient fire-damp to make both explosive when mixed, then the whole passage, c d, will be filled with explosive mixture. But the air in the air-course, c b, may be sufficiently pure to dilute that coming from c d below the explosive point; or if not, the main current itself may be so diluted by the air from c d'. In this case the explosion would extend only to d or d', and not to the whole district.

3. If the main return current in c d is not diluted below the explosive point until it meets with another main current, the explosion will extend to the whole district.

4. When all the main currents are explosive, the explosion will extend to the whole of the districts.

It is thus manifest that the purity of the main return current depends on the purity of its tributaries, and the purity of these at any particular time depends on the relative quantities of gas emitted at the face and air supplied to the workings.

In a district of bratticed bords, like that in Fig. 4, if the whole of the air-current is sent to the face of each bord in succession, the last bord will become explosive before any of the others; but if only a portion of the air is sent to the working face, while the remainder escapes towards the next bord under the door or screen at the entrance, then the air in any one of the bords may become explosive, while the others are free from explosive mixture.

The following algebraical expression shows what is the minimum quantity of air that must be taken to ventilate the bords one after the other, it being assumed that the quantity of gas emitted is somewhat equal in each bord.

Let x = the whole current of pure air which comes to the entrance of the first bord.

y = the quantity of fire-damp necessary to make this air explosive.

m = the number of bords from which an aggregate quantity of gas equal to y would be produced.

$\frac{1}{k}$ = the ratio which the part of the current taken to ventilate any bord bears to the whole current.

n = the number of bords through which the current has passed before reaching any given bord.

The composition and proportion of the current taken to ventilate the $(n+1)$ th bord are given by the expression $\frac{1}{k} \cdot \frac{ny}{m} + \frac{x}{k}$ and

when leaving this bord it is $(\frac{1}{k} \cdot \frac{ny}{m} + \frac{x}{k}) + \frac{x}{k}$. Now, the mixture $\frac{y}{k} + \frac{x}{k}$ is explosive, so that when $(\frac{1}{k} \cdot \frac{ny}{m} + \frac{x}{k}) = \frac{y}{k}$, the mixture at the face of, and leaving the $(n+1)$ th bord, is explosive.

From the above we get $m = n + k$. Suppose, for example, that there are 12 bords, and that the whole of the air taken to ventilate these 12 would become explosive if the gas from 16 similar bords were added to it. Then the minimum proportion of the whole current that would prevent the air at the face of the first bord from becoming explosive is 1-16th, or rather more, the second 1-15th, the third 1-14th, and so on to the last. One-fifth of the whole current would require to be sent to the face of the twelfth, and although this bord produced exactly the same quantity of gas as the first, an explosive mixture would be formed at the face with this or any smaller proportion of the whole current. From these considerations it is seen how the air leaving a district of bratticed bords may not be explosive, while several of the bords are explosive at the face; and how, by slightly decreasing the whole quantity of air, one or more of the bords may suddenly become explosive.

NOTE.—It should, perhaps, be mentioned that the currents are understood to be explosive near the roof only, at first, in the foregoing cases.

III.—ON THE FORMATION AND EXTENSION OF EXPLOSIVE ACCUMULATIONS.

When fire-damp issues from the fissures in a mine it immediately rises to the roof, on account of its low specific gravity (5589, air = 1). It collects in cavities in the roof ("pot holes," and the higher spaces in "goafs"), and in unbratticed working places of which the inner end is higher than the entrance; and from such places it can only escape by diffusing into the outer air. The rate of diffusion per square metre per hour has been determined for certain gases by Prof. J. Loschmidt, of Vienna,* but, so far as we know, scientific investigations have not been made to fix these quantities for light carburetted hydrogen and air; it will, therefore, be necessary to consider only the general law in this case. Consider a space A B C D, closed at the top and sides, and open at the bottom, into which a uniform quantity of gas is admitted, while there is pure air outside. After a time, if the air inside be analysed, it will be found to contain a certain percentage of gas, varying in the manner indicated by the figures in Fig. 6. As long as the conditions are unchanged there will be no change in the quality of the contents at the different heights, but as much gas will escape at the entrance as is admitted at the top. Now, let the outer air A contain 5 per cent. while the same quantity of gas, as before, continues to be admitted at the top, then a displacement will occur, so

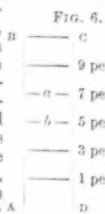


Fig. 6.

— c
— 9 per cent.
— a — 7 per cent.
— b — 5 per cent.
— 3 per cent.
— 1 per cent.

that all the space below b will contain 5 per cent. of gas. But no diffusion can now go on from the entrance A D, until the line above which there is 5 per cent. of gas has moved down to the position A D; and during all this time the whole of the gas admitted at the top will be retained in the space A B C D.

After a time it will be found that the percentage of gas at different heights again remains constant, but that it is different from what it was under the former circumstances. Fig. 7 shows how the quantity of gas has changed at the different heights. The point a, at which the mixture first begins to be explosive is much nearer to the bottom than it was before.

Again, suppose a smaller space, G K L M, Fig. 8, in which there is no explosive mixture, at the top of which, however, gas is admitted, so that the percentage in the space is shown by the figures when there is pure air outside. Now, as before, suppose the air into which diffusion is going on to be changed, so that it contains 5 per cent. of gas, then the contents in the space G K L M will also change before diffusion can take place again. The new percentage of gas is shown in Fig. 9, and here it will be observed an explosive mixture has appeared, without any increase in the quantity of gas admitted at the top. The transition from the consideration of the imaginary spaces A B C D, &c., to the consideration of the cavities in the roof of a coal mine is easy. The gas in the mine is controlled by exactly the same laws as gases elsewhere, so that an increase of one or two per cent. of gas in a ventilating current (although it may possibly not be perceptible by the test usually applied) immediately affects the accumulations; the point at which the air in the goaf will explode moves downwards; cavities in which gas could not be seen before become explosive in the higher parts; and unbratticed working places and the spaces between packwalls are affected in the same manner.

[To be continued in next week's Journal.]

NORTH STAFFORDSHIRE ENGINEERS.

A meeting of the North Staffordshire Institute of Mining and Mechanical Engineers was held last week, at Stoke-upon-Trent. The chair was taken by Mr. T. S. WILKINSON, President of the Institute. There were also present, Messrs. Haines (secretary), J. Lucas, O. Lucas, C. May, jun., J. Coe, J. H. Price, I. Clare, H. Todd, R. Moffit, P. Gaskell, Eardley, H. Sherratt, A. Cleobury, J. Cadman, R. Lawton, &c. Mr. John Derbyshire, mechanical engineer, Kidsgrove; Mr. Joseph Coe, jun., mining engineer, Norton-in-the-Moors; Mr. G. H. Bond, mining engineer, Nottingham; and Mr. G. C. Greenwell, mining engineer, Poynton, Cheshire, were nominated for election as members at the next meeting. Mr. Joseph Millington and Mr. William Millington, Hanley and Bucknall Colliery, and Mr. Levi Moulton, Sneyd Green, colliery managers, were elected members.

A discussion then took place on Mr. ROBINSON MOFFIT'S paper on the subject of "Coal Mining," which was read before the members on June 10, and was now again read by Mr. Haines, the secretary. After a brief reference to the importance of having the shafts, store-rooms, and roadways at the pit bottom sufficiently large, he (Mr. Moffit) expressed his preference for the method of working the coal and dividing the labour as in the Midland Counties and in Wales much before the system adopted in the Durham and Northumberland collieries. He thought there would always be a larger tonnage per acre got by long wall than by stall and pillar working. In discussing the question of ventilation, he advocated a better class of stoppings than were in use in many places at present. A 4½ or 9-in. brick wall was only a temporary affair, as it would not bear pressure, and was swept away by a slight explosion, making way for the after-damp to get to men who would perhaps not be injured by the fire. He thought square pieces of timber cut into the coal at each end and wedged tightly from the roof and endways, with two or three well set props both back and front, could be made to resist any amount of pressure. If they stood the force of an explosion the ventilation could be immediately restored. It was only a question of pounds, shillings, and pence to drive in the metals above the roads instead of making the air crossings as at present with timber and brick. He dwelt upon the importance of the question of ventilation, and observed that no system could be made applicable to all places. In gaseous mines he thought the fan was preferable to the furnace.

Mr. J. LUCAS said with respect to the stoppings, that half circle instead of straight brick stoppings answered well. He thought if they had two half circles of 9-in. walls, with the circles turned outward, tied together in the centre with bands, and packed with something between the walls, they could not be shifted by an explosion of gas. He had never seen them in a single instance give way when properly built.—Mr. MOFFIT said he had never tried the stoppings constructed as Mr. Lucas said; but he had known 9-in. straight walls built of bricks and mortar to be blown right away. The timber stoppings as he (Mr. Moffit) suggested stood firm, and he was confident in one instance saved the lives of a pit full of men.—The CHAIRMAN remarked that perhaps brick and mortar stoppings built as Mr. Lucas mentioned would have stood as well as Mr. Moffit's timber ones. He asked whether Mr. Moffit would not be liable to take fire.—Mr. MOFFIT: I never saw them take fire.—The CHAIRMAN said that wood would burn, and under certain circumstances timber stoppings might take fire. And the expenses of timber stoppings would be greater than brick ones.—Mr. MOFFIT: Not greater than the half circular stoppings.

Mr. LUCAS spoke of the advantage of brick and cement stoppings for water, the walls being built on the principle already suggested, and the space between being filled with fine riddlings of coke.—Mr. R. LAWTON (Silverdale) asked whether timber stoppings would be as durable as bricks and mortar.—The CHAIRMAN said in his opinion bricks were best. He thought brick and mortar stoppings could be made more air-tight, and could be more easily repaired than timber ones, whilst in case of the coal firing the timber stoppings would burn.—Mr. J. COE said he was in favour of brick and mortar stoppings.—Mr. LUCAS: You can make them as tight as coal itself.—Mr. LAWTON (Talke) said the atmosphere would not affect Mr. Lucas's stoppings, but he thought that changes of the atmosphere would cause timber stoppings to contract and expand.—Mr. MOFFIT said that wooden stoppings stood 11 years by being faced up once with planking. A 9-in. brick stopping had to be renewed three or four times in the same period. Timber could be painted and made to resist the action of the atmosphere to a great extent. But, whether they had bricks and mortar or timber, they ought to have stoppings which could not be blown out, and which would secure men's lives in case of an explosion in a part of the pit where they were not working.—Mr. LUCAS said that in 99 cases out of 100 it would be better if some portion of the stoppings could be taken out when an explosion occurred, for if the stoppings stood firm the after-stink filled every place.—A majority of those present signified by a vote that they preferred Mr. Lucas's method of constructing stoppings to Mr. Moffit's.

Mr. LAWTON (Talke) then referred to air crossings being driven in the solid, which he thought was the cheapest plan; but the question was whether in case of an explosion it would be the safest. He knew an instance where apparently the lives of many men were saved by the crossings being movable, in consequence of the thurlings being swelled up. After an explosion the after-damp was rolling up, but fortunately some planks were blown away. In some cases it would be advisable to have airways capable of being opened.—Mr. MOFFIT said ventilation should be restored as soon as possible after an explosion.—Mr. LAWTON agreed that it ought to be restored; but he thought it desirable, if they could, to devise a plan for letting off the after-damp and restore the ventilation without the after-damp being driven into the other part of the works where the men were engaged.—Mr. O. LUCAS said in the last explosion at Silverdale the main air-crossing was blown down, and the after-damp, instead of being forced out to other districts of the mine, was carried to the

upcast shaft. All the men in the district of the explosion were killed, but all the men in the other parts of the pit were saved. The air-crossing had not given way there would have been many more killed.—Mr. HAINES said there were no two pits alike, and in cases like that.—Mr. LUCAS said in the case to which he alluded there were six districts. Two air-crossings were blown down, and in the exploded district the ventilation was restored very quickly. The discussion terminated without any motion, it being understood that Mr. Moffit's paper would form the subject for debate at the next meeting. Mr. Haines, the secretary, was requested to make arrangements for an excursion to Cannock Chase after conclusion of the Autumn Manœuvres.

COAL MINING BY MACHINERY IN SOUTH STAFFORDSHIRE.

On Monday, nearly seventy members of the South Staffordshire Institute of Mining Engineers and the South Midland Institute of Civil and Mining Engineers paid a visit to Pelsall, for the purpose of inspecting one of Messrs. W. and S. Firth's Coal-Cutting Machines at work in the No. 10 pit of the Pelsall Coal and Iron Company, and bidding farewell to Mr. W. Ness, who left South Staffordshire on Tuesday, and will within a few days leave England for the purpose of undertaking the superintendence and development of the Windale Valley Coal Field, in the Central Provinces of India, on behalf of Government; a coal field extending over a surface area as much as 60 miles in length, by from 15 to 20 miles in breadth, and in which one seam of coal, 52 ft. in thickness, has been proved at a depth of 149 ft., and another seam, 32 ft. in thickness, at a depth of 180 ft. The party left Walsall at half-past 11 o'clock, and was received at Pelsall Station by Mr. Ness, who acted as guide to the pit, where Mr. B. Bloomer, jun., Mr. Bissell, and Mr. W. Underhill (three of the directors), Mr. W. Shoemack, and others gave a cordial welcome to the visitors.

Necessarily, the party was divided into sections for the descent of the pit, and while the first section was below the second was engaged in an examination of the arrangements upon the bank. These included a landing stage some 9 or 10 ft. above the pit's mouth, to which the ascending coals are carried, and being run on to a rotating framework, are tipped over into a screen, which separates the small coal from the large, and allows the latter to find its way into a railway wagon drawn into position below. It also comprises, by the side of the engine-house, the apparatus by means of which compressed air is forced down into the pit through a graduated series of pipes—ending with several lengths of vulcanized india-rubber—to supply, at a pressure of from 40 to 45 lbs. to the square inch, the motive-power to the coal-cutting machine. This was at work in a seam some 5 ft. thick, with a solid stoney roof, necessitating but little timbering, and affording very favourable conditions for the trial of the invention. In shape the machine is somewhat like an oblong box, a little over 4 ft. long by nearly 2 ft. wide, mounted on wheels, which raise its upper surface about 2 ft. from the ground, and is supplied with a seat for the driver at the rear end, where the controlling handle and wheel are immediately under his hand, and with a sort of double pick at the other, not unlike an elongated lobster claw, excepting that the inner claw turns outwards instead of inwards. This claw, which can be worked either to the right hand or to the left, and at any angle, drove a with a steady crunching beat, close to the bottom of the seam, the first or inner half cutting in a distance of 18 in. under the most favourable circumstances, and the second, or outer half, carrying the work of its partner in the previous beat to a depth of 36 in. Thus with every beat there were two cuts into the solid coal, the one being just double the depth of the other. That depth varied, however, from 3 ft., as stated above, under the most favourable circumstances—when the machine could be worked close up to the face—down to 2 ft. 5 in., the cut into the coal being not more than 2 in. in width.

To demonstrate all this to the visitors four trials were made, 7 ft. of the face being measured off in each instance. The first length was cut in 9 minutes; the second in 15½ minutes, some delay being occasioned owing to the gauges of the rails and of the wheels being not quite in agreement; the third in 9 minutes; and the fourth, in which the depth was ascertained to have reached 3 ft., in about 10 minutes. The estimate of the capabilities of the machine was stated to be that it would do the work of nine men in holing, and, in addition, save a very large proportion of slack; but, although arranged to be worked by one man, in this case the want of agreement between the wheels and the rails named above rendered the services of a second man necessary, and, consequently, so far showed the invention to a disadvantage. An average of from 18 ft. to 20 ft. of work, from 2½ to 3 ft. in depth, per hour was holing, however, in this trial, after allowing for stoppages; and Mr. Ness, under whose personal direction the trial was conducted, expressed himself sanguine that an average of 15 ft. could be maintained, being 50 per cent. more than the average he anticipated when he first brought the matter under the notice of the Dudley Institute. As to the views of the visitors, the approval expressed was qualified. The thing is new, and old habits invariably assert themselves against innovations. But it seemed to be generally admitted that the machine did its work well under the favourable circumstances under which it was tried; and that it may be expected to answer admirably wherever the condition of a maiden mine and a good roof can be found—such as in the Cannock Chase district generally—but it will not be found suitable for use in the old South Staffordshire district. On the other hand, Mr. Ness, who speaks after experience of all known machines at work, and whose opinion is, therefore, of weight, believes it can be worked under any but the most exceptional circumstances, and that of all existing machines it is the most suitable for use in the shallow coals of South Staffordshire.

At the close of the examination the company partook of luncheon. Mr. W. UNDERHILL presided (in the temporary absence of Mr. B. Bloomer, jun.), and, after the usual loyal toasts, gave "The South Staffordshire and South Midland Institutes of Engineers."

Mr. BLAKEMORE replied on behalf of the former body, and in the course of his remarks said he had been greatly interested in watching the operations of the coal-cutting machine. He had attended all the inspections which had been made of the different coal-cutting machines in the kingdom, and he must say that, with the exception of one little defect, this was the most successful of them all, and great honour was due to the parties who had introduced it.—Mr. B. P. WALKER also responded for the Midland Institute.—Mr. B. BLOOMER, jun., then proposed the health of Mr. Ness. He was not one of those who could speak fluently of either his friends or his enemies in their presence, otherwise he would like to say more than he should be able to do on that occasion. As that, however, was probably the last opportunity they might have of all seeing Mr. Ness, they should wish him a hearty good-bye. To Mr. Ness they must give all the credit of having introduced the machine, and all the blame, too, if there was any, but he thought that must be very small. He was glad to have had Mr. Ness associated with him as his right hand friend for the last three years, and he dared say the company could understand him when he had often wished of late that there was no such place as India. But the Government had very much urged Mr. Ness to go, and going he was—and he was sure that everyone present would wish that he might find himself thoroughly at home in the sultry clime of India. (Cheers.)

The toast having been drunk with three times three and musical honours, Mr. NESS responded. He said the subject of the coal-cutting machine had long been on his mind, and he was sure the time was not far distant when such machines would be as common as easily worked in the mines as were reaping-machines in the fields. As to the one little defect to which Mr. Blakemore had referred, the disarrangement of the rails, that would be easily overcome. What the machine had done that day showed a great increase of holing, as compared with manual labour—showing, in fact, that one machine would do the work of nine men. Holing was justly reckoned as the most degrading part of the work, and owing to the circumstances under which it had been carried on—lying for hours in water, for instance—as the most prejudicial to health of all in the pit; and if, by use of such machines, they could set one-third of the miners free from

* Experimental Untersuchungen über die Diffusion von Gasen ohne poröse Scheidewände. Sitzb. d. k. Akad. d. Wissensch. Bd. IxI. (March and July, 1870).

Mr. HARVEY explained that with the remaining shares now at their disposal they proposed to clear off all their liabilities; and with regard to the future, he had ordered crusher, dressing apparatus, &c., to enable them to deal properly with the mineral. They had some of the lead from the south lode already, and very soon they would in addition be raising lead from the north lode. At first they would require some capital in hand to cover monthly expenses, but they would very soon be raising sufficient lead to relieve them of all inconvenience in that direction. To provide for these they proposed to increase the capital to 20,000*l.*, but should only issue 2000 or 3000 shares as required. All the large shareholders were of the same opinion as to the desirability of the course proposed, and all were agreed that an increase of capital was necessary, so that the proceedings at the special meeting would be of an almost formal character. He might remark that it was not proposed to issue the shares rateably, as some might not be able to increase their interest, whilst others might desire to take more than their proper

tion. If each shareholder sent in his application they would endeavour to make the allotments as fairly and satisfactorily as possible.

The resolution was then unanimously carried, and the proceedings terminated with a cordial vote of thanks to the chairman and directors, in acknowledging which the chairman expressed his full conviction that the shareholders might congratulate themselves upon the success of the undertaking and the prospect of an early dividend.

CRENVER AND WHEAL ABRAHAM UNITED MINES.

The seventh ordinary general meeting was held on Thursday, Mr. GEORGE STRATTON in the chair.

Mr. GEORGE H. CARDOSO (the secretary) read the notice convening the meeting.

The directors in their report stated that since the inspection of the mines by Capt. Tregay, a few weeks since, there had been scarcely any alteration in development, except that his favourable predictions were being gradually verified. The weekly reports from the mines showed that the interests of the shareholders were being attended to, and that everything was being done as far as possible to forward the enterprise. The directors were obliged to make a call a short time since to meet the necessities of the mines, and they considered that that was the most legitimate way of raising money. The fall in value in the price of copper had entirely upset calculations; there appeared, however, every reason to believe that the present low price was only temporary. The vendors persisted in carrying on a lawsuit against the company for balance of purchase money, which the directors believed was being successfully defended. Naturally, each party to the lawsuit fancied that they were aggrieved, but the directors of the company were as ready at the present time as they had always been to settle the points in dispute in a spirit of loyalty and good faith.

The CHAIRMAN said that so little time had elapsed since the last meeting that there was really very little to say in respect to any change or improvement in the mine. One of the most important features which had taken place was that since the last meeting the 234, west of Pelly's shaft, had proved good for tin. The accounts with respect to the sales were rather better than what appeared in the balance-sheet, and for this reason, that the balance-sheet was made up to August 1, and there was copper sold on July 31 to the amount of 10492.2s. 8d. and 2844.4s. 2d. of tin, which was not included in the balance-sheet, because the money had not been received. He also wished to give an explanation with respect to what might be called the vacillating policy of the directors, in at one time saying that they intended to have no call, and then turning round and saying that they found a call necessary. The fact of the matter was this. A gentleman whom the directors at the time believed to be perfectly good had promised to guarantee the interest of the money, but the directors afterwards came to the conclusion that the gentleman's credit was not so good as they anticipated, and such afterwards proved to be the case, and the directors were obliged to make the call, which at first they did not intend to make. He believed that the mine was being gradually developed; there were a great many points which might at any time turn out a great feature, but, of course, a considerable expenditure was requisite to develop them. The price of coal had been against them; and then, again, the price of copper had sunk very low compared with that which ruled some time since. By the latest advices from Cornwall copper was rising in value, and tin also was a better price. He thought, looking at all the circumstances, that there was nothing to be discouraged at—in fact, he believed they were just on the eve of great results. He moved the adoption of the report and accounts.

Mr. CLARK asked for some information respecting the action with the vendors? The CHAIRMAN said that the action was brought by the vendors to recover from the company the sum of 1874, the balance of the purchase money, which the company refused to pay on the ground that it was discovered shortly after the company started that the lease of the Crenver Mine had only a few months to run. Some discussion ensued on this point, and some shareholders thought the directors had acted unwisely in defending the action; and that they ought to have paid the money and taken up the lease; whilst others and the majority held that the directors had taken the course which was best calculated to protect the interests of the company in defending an action which they believed to be unjust.

Mr. WILCOCK expressed doubts, looking at the large expenditure, whether the company would prove a success.

The CHAIRMAN pointed out that in all adventures of this kind it was absolutely necessary to sink a good deal of money before any return was secured, and although there was no profit up to the present time, that was no reason why there should not be a good future for the company.

Mr. ARTHUR WILLYAMS made some observations with respect to the lawsuit against the company, in which he and others are plaintiffs; he did not, however, appear to have the sympathy of the meeting.

Captain KITTO, who had been asked a few days previously by the board of directors to resign his position, made some remarks of a depreciatory character, which were badly received.

The CHAIRMAN said that at former meetings Capt. Kitto advocated the vigorous development of the mine, and possibly his having been so connected with the company might have had some influence in bringing about his present change of opinion.

After some discussion, there was a very general expression of opinion that the directors should be supported in a vigorous policy to develop the mines.

A letter was then read from the parser, giving a satisfactory account of the prospects of the mine.

The resolution for the adoption of the report and accounts was then put, and carried, and a vote of thanks to the Chairman and directors closed the proceedings.

ABERYSTWTH SILVER-LEAD MINING COMPANY.

The ordinary general meeting of shareholders was held at the company's offices, Moorgate-street Chambers, on Wednesday.

Mr. W. J. HASLAM in the chair.

Mr. ROBERT GARLAND (the secretary) read the notice convening the meeting, and the balance-sheet, &c., to July 31, and reports of the directors and agent were submitted.

The directors reported that it was decided on taking possession of the mines to sink the Penrhin shaft to the depth of 40 fms. below the adit level, or 36 fathoms from the surface, which will open up a great extent of new ground. This has now been done to within 7 fms. of the 36, and when that is gained levels will be driven on the course of the lode, and it is confidently believed that the yield of lead ore from these will well repay the shareholders for their outlay. The old levels, driven by former adventurers, have at the same time been followed up, and the sum of 1774.18s. 2d. had been realised by the company from the sale of lead ore obtained from them, as will be seen by the mining account. Some interruption took place during the early part of the summer from leakage from one of the supply ponds, which has now been repaired. The directors believe that the mines are now in thorough working order, and they trust, on the occasion of the next annual report, to be able to congratulate the shareholders on their success.

The CHAIRMAN said that before asking the shareholders to adopt the report and accounts he would make a few remarks. The directors would have liked to declare a dividend as much as the shareholders would have liked to receive one, but they would see from the cash account that such a course was out of the question; instead thereof they would have to ask them to pay up the remainder due upon their shares, but they hoped that the economy with which they carried on their business would not only satisfy but induce them to furnish more capital at some future time should it hereafter be necessary for the further development of the mine. They had doubtless a very valuable property, and he might safely say there was a fortune in the mine for the company, but both time and money were necessary to bring it out. They had striven to make the plant and machinery perfect, and they believed it would do them good service. They had had a considerable leakage in one of their ponds, but it had been repaired at an expense of 300. or 400., and he believed they would henceforth have no difficulty; they had also erected a long series of launders, which, by carrying the water from Bwlchgwyn to Penrhin, would enable them to use it twice. About 100 tons of lead had been obtained from the old levels, and they had good reason to think that the quantity obtained from this source would increase. Indeed, the sale of 100 tons of lead by a company that had been so short a time in existence would generally be considered very satisfactory, and in their case they had the further gratification of looking forward for still larger returns. They were proceeding rapidly with Penrhin shaft, which they intended sinking to the 56 fathom level, and they were now within 7 fathoms of that depth. They hoped to meet with a good bottom of ore, and in driving east and west from the 56 they would come under the ore ground 30 fathoms above. As in all Cardiganshire mines, they looked for their profits in depth, and they had no fear that in their case they would be disappointed. In a later report the agent states that—

Sept. 3.—The setting on Saturday last was the tribute pitches for two months by eight men, at 7s. per ton as before; the lode looks very encouraging, and the men can carry fair wages. The lode in the Penrhin engine-shaft is daily improving, and looks promising to do well, as we let the directors to expect at the 36, in fact we are opening up a fine mineral property. Our reserves are full of water; this will carry us on from the present time to next summer. The dressing is going on satisfactorily—we have begun for another parcel to be sorted. The machinery, pit-work, &c., are in thorough working order, and we have sufficient of the latter pumps, &c., to carry up to the 36, at which point we shall drive east and west on the course of the lode, shortly after which we shall do something better. —JAMES TREVETHAN.

They had an abundance of water, which left them independent of coal, which was an important consideration, considering the present price of fuel. He was not aware that he had any further remarks to offer, but would be happy to answer any questions which shareholders might have to ask.

Mr. HUGHES enquired what distance they would have to drive east and west at the 36 to come within the ore ground referred to as having been found above?

The CHAIRMAN said they would be obtaining ore almost immediately.

Mr. BUCKLAND would like to know what the captain estimated would be the cost

of finishing the Penrhin shaft?—The CHAIRMAN said it was being sunk at 20s. per fathom, so that it would cost about 1500. to finish.

A SHAREHOLDER was glad to hear it was being done by piecework, as he believed that mode of payment was much more satisfactory to both parties.

The report and accounts were then unanimously adopted, and Mr. Stead, public accountant, was appointed auditor for the ensuing year.

The proceedings terminated with the usual complimentary vote of thanks to the Chairman and directors.

SOUTH ROSKEAR TIN AND COPPER MINING COMPANY.

At a general meeting of adventurers, held in Mr. Gregory's office, St. Vincent street, Glasgow, on Sept. 4 (Mr. G. STEWART ANDERSON in the chair), the statement of accounts and vouchers from Jan. 25 to July 12 inclusive were laid before the meeting, showing an amount at debit of 16617.12s. 7d. Reports by Captain Skewis and the resident agents having been read, a call of 10s. per share was made. Messrs. R. H. Leadbetter, George Alston, G. Stewart Anderson, Wm. Ewing, and T. Currie Gregory were re-elected to the committee, and four guineas a month allowed them for their services. A vote of thanks to the Chairman closed the meeting.

Twistock, Sept. 1.—I beg to submit a report by Capt. John Brentnall and Vincent, the resident agents on the works carried on at the mine, since our last meeting, on Feb. 27. From it you will see the large amount of work that has been done, and the advanced state of the surface erections for stamping and dressing the tin ores. The pumping of the mine has steadily progressed, and in three months I fully expect that the mine will be drained to the 110, the depth of the South Roskear part of the sett. Forty heads of stamps have been put to work, and are fully employed in stamping surface stuff, which has exceeded the valuation we put on it. We have now a large quantity of tin ore in the sett, and we have been enabled for us to put more men to work, but as soon as this is effected we have plenty of points on which to put men to break tinstuff for stamping, of higher quality than that of which the waste heaps are composed, and when the mine is drained to the 140 (by which time the whim-engine will be finished) we shall have an extensive mine ready to be worked. As the mine is further drained more stamps will be needed. It will be in the memory of all that the estimated amount required to complete the erections on South Roskear sett was 10,000., and from an inspection of the accounts it will appear that the amount has been exceeded, and that more money is required. In explanation, I would remind the shareholders that at the time they commenced work in 1872, they held the sett of South Roskear only. Since then that of Gerry has been added, free of charge, except that of legal expenses of lease. This sett was obtained by us for you amidst much opposition, and only on condition that the pumping-engine be placed on the old Gerry shaft. By kind yielding on the part of the lord of South Roskear, Mr. Penlvar, this was arranged, and owing to this addition to the property it was seen necessary to erect a 70-in. pumping-engine instead of a 50, on the Gerry shaft, fitted to drain the united setts of Gerry and South Roskear, and that adjoining, which has also since been secured from Mr. Basset. You will then see that the shareholders have been enabled to acquire two valuable setts, and while this has immensely increased the value of the property, the expense of development has not been doubled. Indeed, you have secured all the ground lying vacant in the centre of the best mines in the district. There are no charges in the working of these properties but those of the royalty, and permanent damages for land and their extent, situation, and prospects point out to me a future second to none of the best mines adjoining. Owing to this consolidation of these setts, it has been deemed desirable to place the stamps and dressing floors at a greater distance from the shafts than could have been done had the property been restricted to South Roskear proper, but this expense will be amply repaid by economy in working, and by limiting the risk of damage to valuable land by the arsenical vapour arising from the burning of the tin ore. Further, the cost of materials and wages have greatly increased since we made an estimate for the development of South Roskear proper; and further, the committee have thought proper to order that the accounts be kept in two forms, as construction and revenue, so that each might bear its own burden. All these demands require more capital, and I recommend that a call be made of 10s. per share, which would yield 6000. to meet the extra cost in construction. The result would be, in my opinion, a dividend at early in the coming year as your property is developed. I am glad to say that my opinion of its value increases.—WILLIAM SKEWIS.

Sept. 1.—Gregory's Engine-shaft. We have two 11-in. plungers fixed, and two drawing lifts, by which the water has been drained about 6 fms. below the 70, below the adit; together 10 fms. from surface. We shall continue the lower drawing lift to the 85, at which point we expect to find the bearings on which rested the original piston that carried the third plunger lift. We expect to complete the fixing of third plunger at this point, and drop a new drawing-lift to the 100, draining the water at that point in from five to six weeks from this date. We are expecting to find in the 90 and 100 a large quantity of very valuable tin ground, which will be set to work as soon as the water is out, and skip road brought down for drawing the stuff. The balance-hole has recently been fixed at surface to the pumping engine, with the object of saving water, and we have found ground out, and bearings in for balance at the 70, which we shall utilise when necessary. We have commenced to put in skip road in the western whim-shaft, and also in Dunkin's shaft. These are let at 8s. per fathom, and the men are likely to fix about 50 fms. per month in each. There are two pitches set to eight men in the 30, east of Vivian's shaft, at 13s. 4d. in 17. Two pairs are working surface burrows at tribute 12s. in 17. Shaft tackle has been fixed on western whim-shaft, and pulley-stands are being pushed on with, which, when finished and skip road down, will enable us to draw stuff with the 15-in. steam winch from this part of the sett. A house is built for 28 in drawing engine, which is now being brought on the mine, and will be fixed with all necessary speed to command the drawing from Vivian's, Dunkin's, and other shafts; this engine will enable us to work the mine upon a very large scale. We have a very efficient 36-in. steam stamping engine, with two boilers, and 40 heads of stamps attached to same, all new, well fixed, and working to our entire satisfaction. The floors are in a very forward state, 12 new round centre head boulders complete, and 9 more in course of erection to treat the slimes. There are also two large walled slime pits built, and we are now excavating ground for two others. At present our stamping is confined to the burrow stuff, and will be so until the floors are properly fixed up to prevent waste of tin from ground work. So far the stuff treated is turning out quite equal to our expectations, and we believe that as soon as we commence to operate on underground stuff large and regular sales will follow. We have recently seen the lord's agent; he approves of the site you selected for burning house floors, &c., when last here, being near our other works, will make it very inexpensive to us in removing "wits" from the first dressing floors. We have, as desired, arranged with North Roskear agents to burn our "wits" in one of their ovens, and hope to be able to continue this until our own burning house, &c., are completed. We purpose beginning this as soon as the boiler-house and stack of wits are finished. On the whole, we consider that the prospects of the mine are exceedingly good, and we believe, when wholly opened will in results compare favourably with any mine in the district.—JOHN BRENTNALL, WM. VINCENT.

DRAKE WALLS TIN AND COPPER MINING COMPANY.

At a meeting of adventurers, held in Mr. Gregory's office, St. Vincent street, Glasgow, on Sept. 4 (Mr. G. STEWART ANDERSON in the chair), a statement of accounts and vouchers from Jan. 1 to July 5, inclusive, as well as a statement of bank accounts, showing a profit on revenue account of 379.19s., having been submitted, reports by Capt. Skewis and Dunston were read, when it was resolved that Captain Skewis be authorised to push forward the works as proposed in the reports, and to accept Mr. Mathews' tender for new machinery and buildings, and for the erection of the 40-in. stamping engine, which is to drive the 100 heads of stamps. Messrs. George Alston, G. Stewart Anderson, John Stewart, G. Lumb, Henry Herbertson, and T. Currie Gregory were elected to the committee, and five guineas per month allowed them for their services.

A vote of thanks was unanimously accorded to Capt. Skewis for introducing the mine to the shareholders, and a further vote to the Chairman closed the meeting.

The following reports were read to the meeting:—

Sept. 1.—On meeting you for the first time as manager of this property, I have to congratulate you that you have acquired an interest in it, as I believe we shall speedily be able to carry it to a decided success. My long acquaintance with its merits, as well as with the causes which drove the late company from it, led me to look well after securing it for my friends, and from what I have seen of it since I am glad I did so. You will see by the accompanying report by Capt. Dunston, the resident agent, what has been done since Jan. 1, and what we propose to do. A good deal of the heavy erection of machinery has been done, and this has chiefly engaged our attention, but we have not overlooked the desirability of proving, in some measure, the richness of the mine, and although we have had only 12 loads of stamps at work a small portion of the year we have sold 1498.3s. 11d. of tin at a price of 37s. 19s. In addition, I am glad to say that as we drain the mine we find not only the lode standing, whole at the ends, but also, in working into the south side of the old stopes, a large mass of rich tin ground unworked to the surface, and likely to continue throughout the mine. A large and lasting mine is thus laid open, besides hundreds of thousands of tons of tin waste on the surface; and what is alone wanted to make large profits is abundance of stamping and dressing machinery. The sum of 10,000., raised for the purposes of the mine, will be ample to provide this. Plans, specifications, and estimates for the immediate erection of 100 heads of stamps are now being prepared, with which the machinery now on the mine I look forward to paying 15 per cent. next year, and this, if the price of tin remains about where it is at present, will be increased thereafter.—W. SKEWIS.

Aug. 25.—Since Jan. 1, the commencement of the present company, we have taken to pieces the 20-in. cylinder pumping-engine, taken down and rebuilt boiler of engine-house, put in new spring beams and floors, new air pump bucket and well work complete, new nozzles and steam pipes, new piston and rings, making both the engine and engine-house in thorough working and sound condition. Also changed the pitwork in the engine-shaft from 11-in. to 13-in., put in new stays to main rod, with pulleys to carry the same, and further out ground and put in new travelling sheaves and loops for breaking the underlie at the adit level, which answer the purpose admirably. The surface balance hole has also, at considerable cost, been made equal to new. The 40-in. stamping engine and 100 heads of stamps have gone a great deal of repair, and the 40-in. stamping mills, and both are now working fairly. There are two water stamping mills which were completely broken down, but we have put them in sound working condition—two 24 heads of stamps, which will be of great assistance to us during the wet season. The adit level, choked for many years, has been cleared and secured throughout the mine. This, in effect, will considerably lighten the cost of pumping, and, with the repairs to the engine, already effects a saving of not less than 1000. per month. We have cleared the leads on both north and south sides of Hingston Down, a distance of at least four miles. These will give an abundance of clean water for dressing purposes, as well as working the 24 in. of stamps for the greater part of the year, thus enabling the underground water to be discharged through the adit, instead of being as heretofore pumped to surface; and when the reservoir is enlarged, as contemplated, it will, no doubt, be equal to our requirements, independent of underground water. The 40-in. stamping engine is now being taken out for the purpose of removal to a more suitable and central position, for the erection of about 100 heads of stamps (or more if required), in connection with same, to which will be added a completely new dressing floor, so that one dresser may command the whole of the stuff and works. We have levelled and paved ground for spalling and dividing the tinstuff, built walls for slides, and laid down tramway from Brentnall's shaft to the same. Since the engine was set to work we have drained the mine to within 14 fms. of the 60 fm. level, and expect to reach the 70 in about five weeks, which will be as deep as the former company could keep the water, with the engine in its then wretched condition. Below this point the length of ground to be drained will be shortened by one-half, and can speedily be pumped out. It is very satisfactory to find that the old miners of Drake Walls are taking pitches in each level, as the water is being pumped, at tribute not exceeding 10s. in 17. All are getting good wages, and some have done well. At surface we have two pairs of tributaries work-

ing the rock burrows at 8s. in 17. We are obliged to refuse many applications for work these burrows in consequence of not having sufficient starting power, and have also let a portion of the slime heaps for four years to a party of West of Wales wall slaters in dressers, they to provide all the necessary machinery, and to make the walls, &c., and to fix and keep the same in permanent repair, and make all the necessary amount of repairs we have had to do to the machinery in general, and the price of stamps, &c., we have sold 1848.3s. 11d. worth of tin, and the value of the mine, regular and largely increased, and we are convinced that the profit on the works of this mine, with 100 heads of stamps, will be equal almost to any mine in the county.—E. DUNSTON.

[For remainder of Foreign Mines, see to-day's Journal.]

TYLLWYD SILVER-LEAD MINING COMPANY (LIMITED).

Since the issue of our last Circular, Capt. Hamilton, one of the directors, has visited this property, and has returned highly pleased with its position and prospects. He fully corroborates the reports of Capt. Paul, the manager, and to the value of the lodes opened upon, and states, as his opinion—an opinion, as to the value of the general in the district—that Tyllwyd will prove one of the richest, and which, able mines ever opened out in the Principality. Some magnificent specimens of ore from the various points of operation have arrived in London, and may be seen at the offices.

Tyllwyd is situated in the heart of the best silver-lead producing district in Cardiganshire, and is surrounded by many of the largest dividend-paying mines in the county. Through this sett run three lodes, which have in bygone times yielded a shallow depth yielded immense riches. Their value is shown by the fact that they are sunk upon, leading to the well-founded conjecture that they will in depth be found even more productive than near the surface. The late owners worked shafts on the backs of the lodes by means of adit levels, and made returns therefrom a considerable amount. Their deepest point of operation was not more than 10 fms. from surface. Want of adequate machinery alone prevented them from pursuing their operations in depth. We introduce this investment to the public with the greatest confidence. The small amount of purchase money—5000., of which the vendors accepted no less than 30000. in fully paid-up shares, compared with the working capital (70000.)—contrasts favourably with the enormous premiums which have of late been exacted for mining properties at home and abroad. This mine will be worked with the strictest economy, compatible with a vigorous development of its mineral resources, while at the same time the directors will take every care to avail themselves of modern improvements in machine appliances. Every one of the reports by some of our best mining authorities (all intimately acquainted with the mineralogy of the district) will convince the most sceptical that the capital will be amply sufficient to place this property in a permanent dividend-paying condition.

It is an historical fact that the Principality of Wales is one of the most productive fields from which the United Kingdom derives her vast mineral resources, and are now returned by Her Majesty's Government at over 43 millions sterling annuum. Enormous fortunes have been and are now being made by those who judiciously invest in mining operations. Many of the colossal fortunes of the present day have been derived from a nucleus formed by an investment in the taking for the discovery of mineral wealth. For example, the Dyffryn Mines, near Brecon, brought such large sums to the Right Hon. Milner Gibson, the Right Hon. Sir John Lubbock, and the Right Hon. Sir John Lubbock, Esq., and that prolific mine (the Van), whose shares, a little while ago have been bought for few shillings, are now quoted at 10s. each. History records numerous instances of such gains, and even attests by mine that no other branch of industry can hope to equal, or even attempt to approach. The enormous wealth of the lead and silver lead districts of Cardiganshire has been more or less known and appreciated for ages, and great profits have been obtained even under the most defective processes of working, yet there is still room in the observation of a writer of high repute, that many of them are still little more than surface diggings; and although within the last quarter of a century considerable advances in the general knowledge and power of the miner have taken place, in many instances continue to be carried on in a very inefficient manner. With respect to working, in fact, there has been but a partial improvement since Sir John Peters stated 200 years ago that the country was losing annually more than one million sterling, in consequence of neglecting the Cardiganshire mines. Seeing that money at that time possessed at least threefold its present value, and remembering the vast discoveries which have taken place since Sir John Peters' time, together with the superior power now existing for getting and treating minerals of all kinds, it is probably moderate to estimate that the adequate development of the mines in this county would add 5,000,000. sterling per annum to our national income. Of this gross sum, one-half at least might be safely paid to the profit account of the persons taking part in well-planned enterprises, due to the important object in question.

A few instances will suffice to indicate the results which have been obtained by mines here worked under circumstances calculated to do justice to their capabilities. The mines mentioned below are all in close proximity to Tyllwyd.

Beginning with the western part of Cardiganshire, and travelling eastward to Plynlimon Mine and mountain, Broadford is the first mine to the west, or near the seaboard. It has been worked for some years. The mine has paid dividends 1100. on every 1000. share. The lode is in some parts 60 ft. wide. Darren Mine has reduced 1,000,000. worth of lead, and silver at immense rates. Old Gwynn produced nearly 100,000. profits. In the valley is South Darren, formerly Cwm Sebon, rich in silver lead, and yielding profits of 2000. to 3000. a year. Further up is Cwm Rish, not so rich in silver as South Darren, but a greater profit, the lode containing a larger quantity of lead to the fathom, and the mine has produced 1,000,000. worth of lead, and silver at immense rates. Bulh Consols, once abandoned, but now giving a profit of 2000. a year. To the north, half a mile distant, is East Darren, formerly worked as Cwm Sebon, a mine of rich silver lead, and making profits of 6000. a year. This is Sir Hugh Myddelton's famous old Cwm Sebon, which gave him 20,000. a year. Llysbois has paid 347.10s. on every 1000. share. To the north of Aberystwyth, near the village of Tal-y-bont, the celebrated mine of Afton, which has produced 1,000,000. worth of lead, and silver at immense rates. The Tal-y-bont and Bryn Arian, and Ysford mines, all old dividend mines, are now in course of being re-opened by joint stock companies. A little distance to the north east the Plynlimon is now being worked at a profit, and is likely to considerably increase. The mines to the south, consisting of Bwlchgwyn, which is giving about 1500. a year profit, Cae-gwyn, Rhedol, and the Tal-y-bont, are all making small profits, and have some valuable ore ground below them. Cae-gwyn is the adjoining mine to Tyllwyd, and has greatly increased during the last six months. The Plynlimon and Cwm Sebon Mines are in the same vein, the latter lying about six miles to the south of the former, and the old Gwynn produced nearly 100,000. profits. To the west, and down the summit (the Ystwyth), lie the Llysbois Mines; to the north is Pen-y-bont, having 120 ft. wide, 150 tons of ore monthly, and making a profit of 2000. to 3000. a year, after having given more than 200,000. in profits. South of the River Tywys the mines of Loglwyd, Gloglwyd, and Gloglwyd, are all rich and profitable mines. There are some other mining undertakings we have not noticed, but it may be said that the Cardiganhire mines are making 100,000. a year profit, while the Tyllwyd mines are working at a small expenditure.

These examples are but a few of those which could be cited. They represent, it will be observed, profits obtained up to the present time only, and which profits will be greatly increased by the new machinery and buildings now being erected, and by the fact that the mines are in close proximity to Tyllwyd, and that the scale of dividends will be a large one, and that the mine will prove as profitable as any of the profitable properties immediately surrounding it, it is reasonable to anticipate that the scale of dividends will occupy a prominent position in the records of successful mining. It is an important fact that this is not an undertaking in which the lapse of years and the expenditure of large sums in sinking shafts, erecting machinery, crushing mills, dressing floors, &c., is required before profits are realised. This preliminary work has been in a great measure got through by a considerable outlay, and although a great wealth of lead ore has already been extracted, as noted in the immense heap of boulders estimated to be worth 50000. lying on the surface, practical investigation of the most trustworthy kind has shown that the resources have as yet been "scarcely tapped," and that when depths of 30 and 100 fathoms are attained enormous yields may be looked for.

The Tyllwyd Mine possesses exceptional and great advantages with respect to the acquisition of unlimited water power, lasting the year throughout—ample for all the purposes of the most vigorous working down to any depth that can possibly be required, thereby saving the expense of steam machinery. The mine is situated on a hill, rising very abruptly, many hundreds of fathoms of boulders will be obtained by the further driving of the lode, thus not only will a vast amount of stopping ground be economically obtained, but the mine to a great extent will become self-draining. The natural advantages of the sett form an important element in the anticipations entertained as to the ultimate success attending its full development. The configuration of the ground is so peculiar as to allow of extensive explorations in virgin ground by means of adit levels being driven at a comparatively trifling expense. This mine is also excellently placed for the carriage of ore and materials, being only 7½ miles from the port of Aberystwyth, to which there is an excellent turnpike road.

In conclusion, with these facts in our possession, we submit the Tyllwyd Mine as one of the most solid and profitable home investments in which the public has for a long time been invited to participate. A high and lasting return may be confidently relied upon. The shares have already risen to a premium of 75.6s. per share, and we firmly believe they will not be obtainable at many times this figure immediately the machinery is got to work and returns of lead ore are made. It needs but the erection of crushing and dressing appliances to enable the directors to pay large dividends.—H. Ireland and Co.'s Circular.

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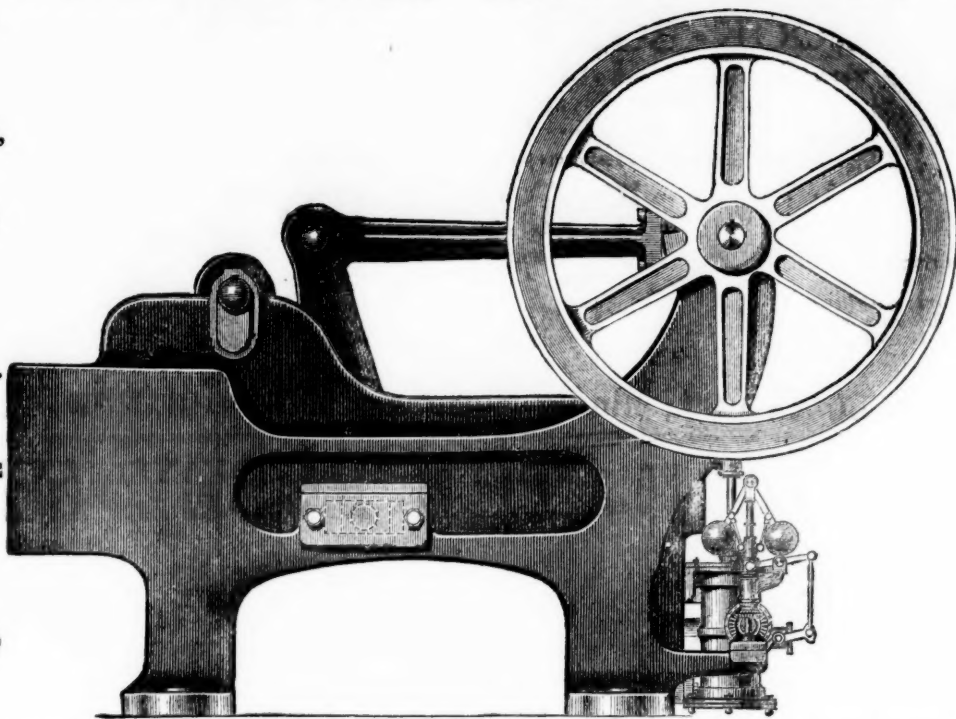
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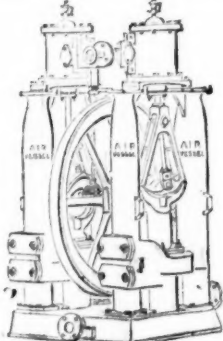
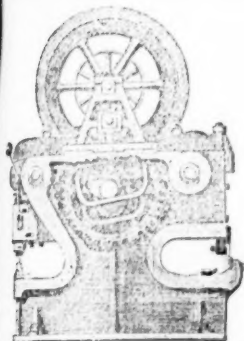
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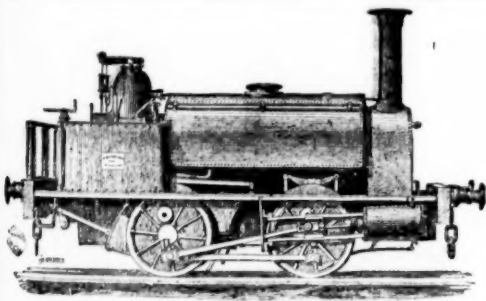
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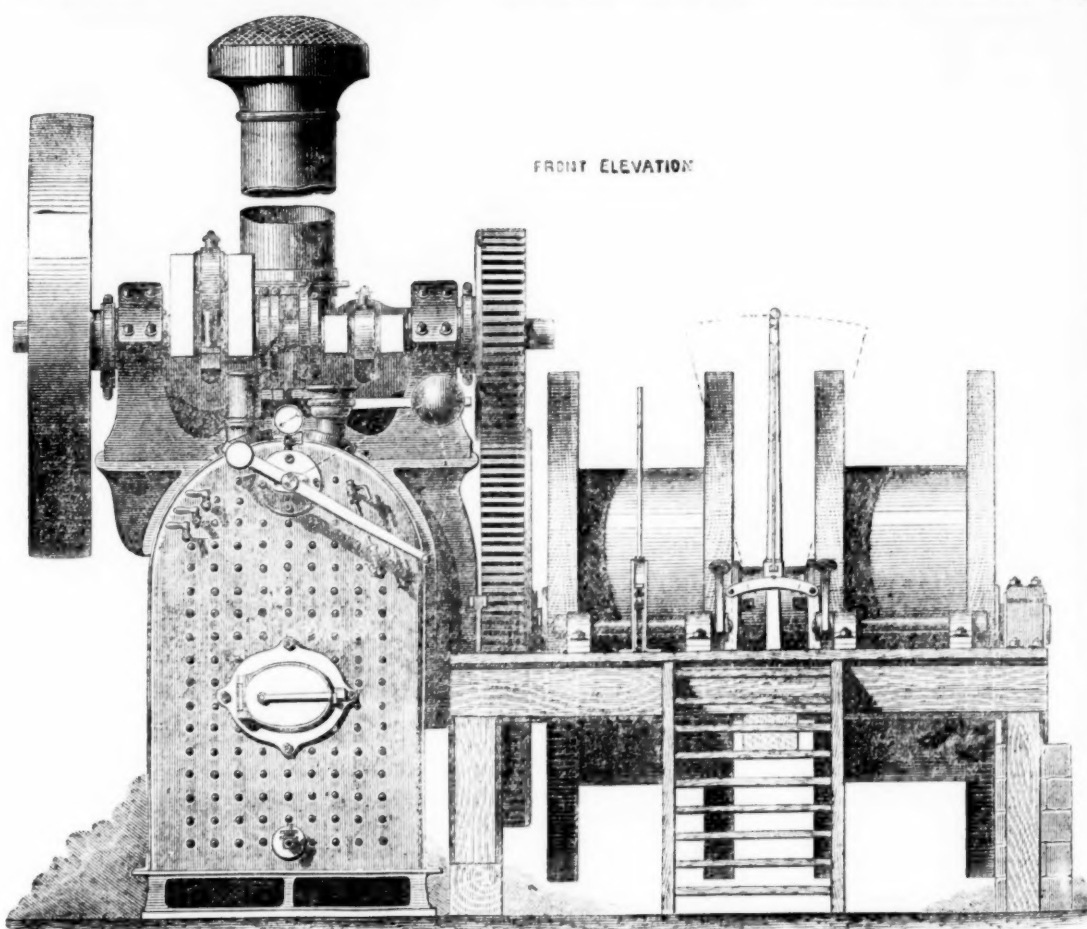
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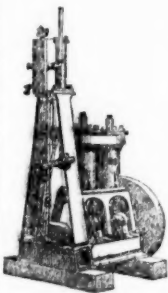
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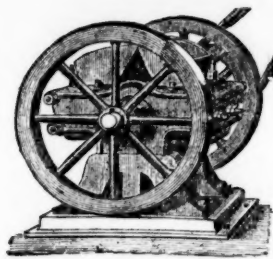
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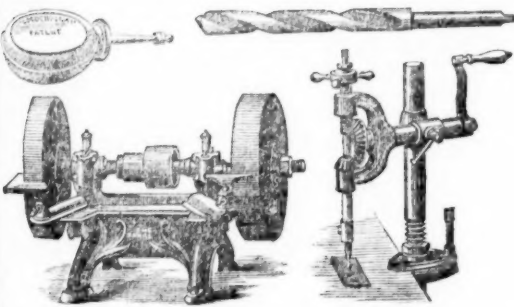
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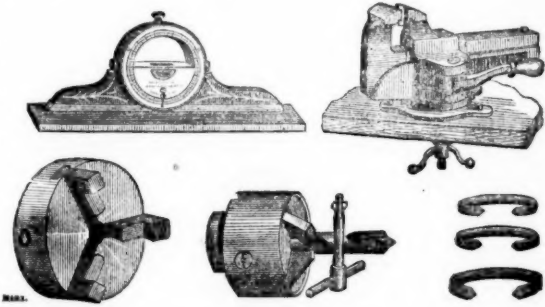


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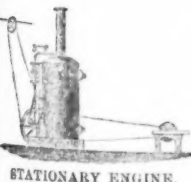
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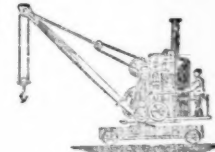
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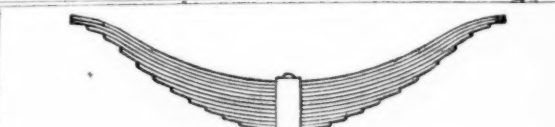
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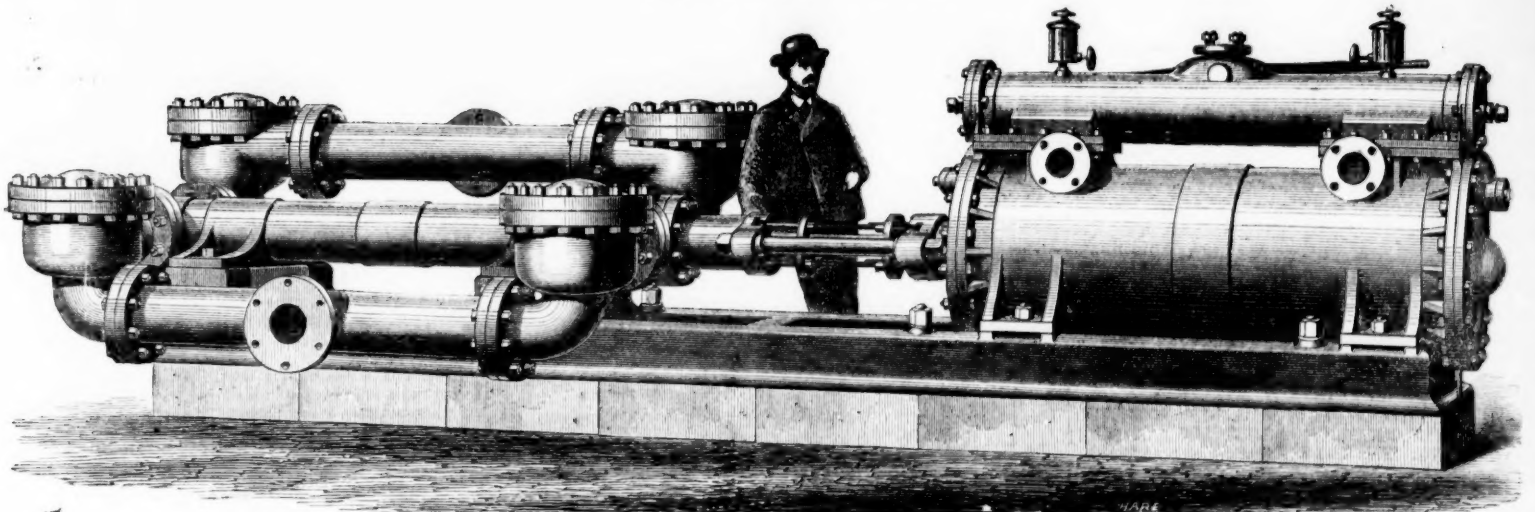
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Extract from "ENGINEERING," September 6th, 1872:—

"The accompanying engraving illustrates a large specimen of the 'Special' Steam Pump, which was brought before the public about four years since by Messrs. Tangye Brothers and Holman. The Pump is the invention of Mr. S. Cameron, of New York, and since its introduction Messrs. Tangye have turned out nearly 3000 from their works.

"These pumps are of various sizes, and at first only small ones were made, but as their usefulness became developed the manufacturers designed pumping engines on the same principle for use in collieries. They were first applied to this purpose in the Newcastle collieries about three years since, and through the efforts of the late Mr. A. Stansfield Rake, under the direction of Messrs. Tangye, about 130 of these pumps had been introduced—principally in the collieries of the Durham and Newcastle districts, up to the end of 1870. They were adapted to perform the required duty—varying in almost every case—of forcing from 1000 to 10,000 gallons per hour from depths ranging from 100 to 500 ft. The success of this system of pumps led Mr. J. Bigland, the manager of Messrs. Pease's Bishop Auckland Collieries, to conclude that it was adapted for yet heavier work. The result of his investigations into its working led to the manufacture of the engine we have illustrated, for the Adelaide Collieries, belonging to Messrs. Pease, at Bishop Auckland.

"The construction of the Special Steam Pump is so well known

that we need now do no more than refer to the dimensions of the various parts. The steam cylinder is 26 in. diameter, and the pump—which is double acting—is 6½ in. diameter, with a 6-ft. stroke. The slide valve is steam-moved, and its alternate action is effected by means of two steel reversing valves, operated by the piston in the interior of the cylinder at either end. Hence there is no external mechanism except the piston rod, a few inches only of which is seen reciprocating between the stuffing boxes of the steam and pump cylinders. In the contract it was stipulated that the engine should raise 120 gallons per minute 1040 ft. high in a single lift, and this is more than accomplished, with apparently as much ease as if its load was delivered at only 100 ft. high.

"The engine-room at the Adelaide Collieries is situated at a depth of 1040 ft. below the surface, and is an arched chamber, about 100 ft. long by 20 ft. wide, and 10 ft. high at centre. At the far end of this chamber is a double-flued boiler, 27 ft. long and 7 ft. in diameter. Placed between the boiler and the shaft is the pumping engine we have been describing. It was started on June 6, 1871, and Mr. Bigland reported that, having measured its duty, he found the average of seven trials to be 137 gallons per minute, thus giving a higher duty than was stipulated for in the contract.

"A still larger Special Steam Pump than the one already described

has since been made by Messrs. Tangye for Messrs. Stannier's Collieries, Silverdale, Staffordshire. The steam cylinder of this engine is 32 in. in diameter, and the water cylinder 10½ in.; the stroke is 6 ft., and the engine has to raise 22,500 gallons per hour 540 ft. high. Two out of eight engines for some extensive coal mines in Germany are also in a forward state; each of these engines is to be capable of raising 150 gallons per minute, or 9000 gallons per hour, 750 ft. high. This system of underground pumping engine undoubtedly carries with it the recommendations of simplicity and great power with a small number of mechanical parts. Its first cost is also moderate, as compared with the method of raising water from great depths by a series of 40 or 50 ft. lifts. Its practical value was tested in 1867 by the award of a silver medal by the Royal Polytechnic Society, which is composed chiefly of mining engineers. In fact, these engines appear to solve a very important commercial question in mining operations—viz., the most economical and effective means of deep mine drainage. Their success has been established in the coal mines of Durham and Newcastle, and there is reason why their adoption should not follow, as occasion requires in the copper and tin mines of Cornwall, some of which are of great depth; and especially for foreign mines, where transport convenience and economy are of paramount consideration."

The "Special" Steam Pumping Engines are in use at the following among many other Collieries:—

Adelaide Colliery, Bishop Auckland.....	3 Pumps.	North Bitchburn Colliery, Darlington.....	2 Pumps.	Stott, James and Company, Burslem	1 Pump.
Acomb Colliery, Hexham	1 "	Newton Cap Colliery, Darlington	1 "	Straker and Love, Brancepeth Colliery	1 "
Blackfell Colliery, Gateshead	1 "	Normanby Mines	1 "	Santon Delaval Coal Colliery, near Newcastle	1 "
Black Boy Colliery, Gateshead	1 "	Oakenshaw Colliery	1 "	Thornley Colliery, Ferryhill	2 "
Castle Eden Colliery	2 "	Pease's West Colliery	2 "	Thompson, John, Gateshead	2 "
Carr, W. C., Newcastle	4 "	Pease, J. and J. W., near Crook	5 "	Trimdon Grange Colliery	1 "
Etherley Colliery	1 "	Pease, J. and J., Brandon Colliery	1 "	Tudhoe Colliery	4 "
Gidlow, T., Wigan	3 "	Pegswood Colliery, near Morpeth	2 "	Vobster and Meils Colliery	2 "
Haswell, Shotton and Easington Coal Company	3 "	Pelton Fell Colliery	1 "	Widdrington Colliery, Morpeth	5 "
Lochgelly Iron and Coal Company	2 "	Railey Fell Colliery, Darlington	1 "	Whitworth and Spennymoor Colliery	5 "
Lochore and Capeldrae Cannel Coal Company	6 "	Right Hon. Earl Durham, Fence Houses	1 "	Westerton Colliery, Bishop Auckland	1 "
Leather, J. T., near Leeds	2 "	Skelton Mines	1 "	Wardley Colliery, Gateshead	1 "
Lumley Colliery, Fence Houses	1 "	South Benwell Colliery	5 "	Westminster Brymbo Coal Company	2 "
Monkwearmouth Colliery, Sunderland	1 "	St. Helens (Tindale) Colliery	1 "	Weardale Coal and Iron Company	5 "

PARTICULARS OF THE "SPECIAL" STEAM PUMPING ENGINES SUITABLE FOR HIGH LIFTS IN MINES.

Diameter of Steam Cylinder	6	8	10	8	12	16	10	14	18	21	14	18	21	26	16	21	24
Diameter of Water Cylinder	3	3	3	4	4	4	5	5	5	5	6	6	6	6	7	7	7
Length of Stroke	24	24	36	24	36	48	24	36	36	48	36	36	48	72	36	48	48
Strokes per minute	30	30	20	30	20	15	30	20	20	15	20	20	15	10	20	15	15
Gallons per hour	2,200	2,200	2,200	3,900	3,900	3,900	6,100	6,100	6,100	6,100	8,800	8,800	8,800	8,800	11,900	11,900	11,900
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump	240	425	665	240	540	960	240	470	775	1,058	330	540	740	1,149	312	540	700
Diameter of Suction and Delivery	2	2	2	3	3	3	3½	3½	3½	3½	4	4	4	4	5	5	5
Diameter of Steam Inlet	3	1½	1½	1½	2½	2½	1½	2½	3	3½	2½	3	3½	4	2½	3½	4
Diameter of Exhaust	1	1½	1½	1½	2½	3	1½	2½	3½	4	2½	3½	4	5	3	4	5

PARTICULARS, &c.—Continued.

Diameter of Steam Cylinder	30	18	24	30	32	18	24	30	36	21	30	36	42	26	36	44	50
Diameter of Water Cylinder	7	8	8	8	8	9	9	9	9	10	10	10	10	12	12	12	12
Diameter of Stroke	72	36	48	72	72	36	48	48	72	48	72	72	72	48	72	72	72
Strokes per minute	10	20	15	10	10	20	15	15	10	15	10	10	10	15	10	10	10
Gallons per hour	11,900	15,660	15,660	15,660	15,660	19,800	19,800	19,800	19,800	24,400	24,400	24,400	24,400	35,240	35,240	35,240	35,240
Height in feet to which water can be raised with 40 lbs. pressure per square inch of steam at pump	1,100	300	540	840	960	240	427	665	960	264	540	780	1,062	282	540	800	1,040
Diameter of Suction and Delivery	5	6	6	6	6	7	7	7	7	8	8	8	8	10	10	10	10
Diameter of Steam Inlet	5	3	4	6	5½	3	4	5	6	3½	5	6	7	4	6	8	8
Diameter of Exhaust	6	3½	5	6	6½	3½	5	6	7	4	6	7	8	5	7	9	10

PRICES OF THE ABOVE ON APPLICATION.

Any combination can be made between the Steam and Water Cylinders, to suit Height of Lift and Pressure of Steam.

TANGYE BROTHERS & HOLMAN, 10, Laurence Pountney Lane, London, E.C.

Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their office, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—8 September 13, 1873.